TRANSCRIPT OF RECORD.

SUPREME COURT OF THE UNITED STATES.

No. 114.

WILLIAM H. CAMMEYER AND SAMUEL LEWIS, APPELLANTS,

vs.

JOHN NEWTON, WASHINGTON ISETTS, CHARLES ECCLESTON, AND WILLIAM L. QUINN.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE SOUTHERN DISTRICT OF NEW YORK.

FILED OCTOBER 10, 1874.

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1 The President of the United States of America, to John Newton, Washington Isetts, Charles Eccleston, and William L. Quinn, greeting:

You are hereby commanded, that you and each of you, personally appear before the judges of the circuit court of the United States of America for the southern district of New York, in the second circuit court in equity, on the first Monday of September, A. D. 1872, wherever the said court shall then be to answer a bill of complaint exhibited against you in the said court by William H. Cammeyer and Samuel Lewis, and to do further and receive what the said court shall have considered in that behalf. And this you are not to omit under the penalty on you and each of you of two hundred and fifty dollars.

Witness, Hon. Salmon P. Chase, Chief-Justice of the Supreme Court of the United States, at the city of New York, on the 26th day of July in the year one thousand eight hundred and seventy-two, and of the Independence of the United States of America the ninety-seventh.

KENNETH G. WHITE, *Clerk.*

S. P. How,
Complts. Solr.

The defendants are required to enter appearance in the above cause in the clerk's office of this court, on or before the first Monday of September, 1872, or the bill will be taken pro cofesso against them.

K. G. W., *Clerk.*

2 (Indorsed:) Personally served on John Newton & Charles Eccleston; others not found. July 26, 1872. George H. Sharpe, U. S. marshal. Filed Sept. 6, 1872.

3 Circuit court of the United States for the southern district of New York. In equity.

WILLIAM H. CAMMEYER AND SAMUEL LEWIS *against* JOHN NEWTON, WASHINGTON ISETTS, CHARLES Eccleston, and William L. Quinn. } Bill of complaint.

To the honorable the judges of the circuit court of the United States for the southern district of New York:

William H. Cammeyer and Samuel Lewis, of the city of Brooklyn, in the county of Kings and State of New York, and citizens of the State of New York, bring this their bill of complaint against John Newton, doing business in the city of New York, but residing in the city of Brooklyn, in the State of New York; Washington Isetts, of Brooklyn, in the State of New York; Charles Eccleston, of Brooklyn aforesaid, and William L. Quinn, of the city of Brooklyn aforesaid; all citizens of the State of New York; and thereupon your orators complain and say:

4 That your orator, the said Samuel Lewis, being a citizen of the United States, was the original and first inventor of a new and useful improved still-water dam, and having made due and timely application to the Commissioner of Patents of the United States for letters-patent therefor, and having assigned all his right, title, and interest, in and to the said invention, to your orator, the said William H. Cammeyer, which assignment was duly entered of record in the United States Patent-Office, upon said application and assignment letters-

patent of the United States, No. 80492, for the term of seventeen years, under the seal of the Patent-Office, duly signed by the Acting Secretary of the Interior, countersigned by the Acting Commissioner of Patents, and bearing date the 28th day of July, one thousand eight hundred and sixty-eight, were, in due form of law, granted, issued, and delivered to your orator, the said William H. Cammeyer, for the said invention, as by the said letters-patent, or a duly authenticated copy thereof, ready in court to be produced, will more fully and at large appear.

And your orators further show unto your honors that afterwards, to wit, on the eleventh day of April, in the year of our Lord one thousand eight hundred and seventy-two, your orator, the said William H. Cammeyer, by an instrument in writing under his hand and seal, duly executed and stamped, and bearing the date last above mentioned, sold, conveyed, and transferred to your orator, the said Samuel Lewis, one equal, undivided half-part of the said invention and letters-patent, and one equal, undivided half-part of any and all claims and rights of action which might have theretofore accrued to him, the said William H. Cammeyer, for any infringement or infringements of the aforesaid letters-patent, or from the making, use, or sale of the said invention, which assignment was duly recorded in liber G 15, page 317, of Transfers of Patents, in the United States Patent-Office, as by the said assignment,
or a duly-authenticated copy thereof, ready in court to be pro-
5 duced, will more fully and at large appear, and that they are now the owners of the said invention and letters-patent, and of all the rights thereby secured.

And your orators further show unto your honors that the said invention is of great utility and value, and that they have good and reasonable grounds to anticipate large gains and profits from the said invention, if infringement of the said letters-patent, by the said defendants and their confederates, shall be prevented.

And your orators further show unto your honors, on information and belief, that the said defendants, well knowing the premises, but contriving how to injure your orators and deprive them of the gains and profits which they might, and otherwise would, have received from the said invention and letters-patent, have heretofore, since the date of the aforesaid letters-patent, and before the commencement of this suit, unlawfully and wrongfully, without consent or license of your orators, but against their will, and in infringement of the aforesaid letters-patent, and the rights thereby secured to your orators, in the city of New York, at Coenties Reef, in the harbor of New York, at Diamond Reef, in the harbor of New York, all within the said southern district of New York, and elsewhere within the United States, made, constructed, and used a machine and still-water dam, containing the said invention and substantial and material parts thereof, and are now using the same, and threaten to continue so to do, to the great damage of your orators, and to their own very considerable advantage and profit, but how much, exactly, your orators do not know and are not informed, and pray a discovery thereof.

And your orators, setting forth more particularly and in detail some of the leading facts relating to the said infringement, further show unto your honors, on information and belief, that the said defendant, John Newton, originated and planned the said infringement, and instigated and directed the construction of the said still-water dam and machine, made and used as aforesaid, in violation of the rights of your orators;
that he caused the construction of the said dam or apparatus;
6 that the said Newton devised the construction of the said dam

or apparatus; that he furnished plans and instructions for the construction thereof; that he procured, or ordered, material for the construction thereof; that he employed men to work in the construction thereof; that he superintended the construction thereof; that he directed the construction thereof; that he has superintended the use thereof; that he has employed persons to work in the use of it; that the persons who have been employed in the use of it have been paid by his direction; that the said defendant, Newton, has claimed to be the inventor of said dam or apparatus; that he claims to have had to turn inventor in contriving it; and that the same was constructed by and under the direction and orders of the said Newton, and was put into practice, operation, and use, as aforesaid, by and under his order and direction, and that the use thereof has been continued as aforesaid, and is still continued by and under his direction and orders; and that the said defendant, Washington Issetts, has been engaged in the operation of the same; and that the said defendants, Charles Eccleston and William L. Quinn, are now engaged in the operation and the direction of the operation of the said machine and still-water dam, made and used, as aforesaid, in violation of the rights of your orators; that they were engaged in putting the same into operation and use, and have been so engaged, as aforesaid, in the operation and use thereof ever since the same was put into operation.

And your orators further show unto your honors, on information and belief, that the said defendant, John Newton, in planning and originating the said infringement, and in preparing to construct the machine and still-water dam aforesaid, caused drawings to be made from the model of the said invention belonging to your orators, which drawings were made without the knowledge or consent of your orators; and that he, in like manner, and in initiating the said infringement, caused another model to be constructed from the said model, embodying its principal features of construction, as set forth in the aforesaid
7 letters-patent, and that he obtained from the United States Patent-Office, and in like manner used a copy of the specification and drawings of the aforesaid letters-patent.

And your orators further show unto your honors, on information and belief, that the said still-water dam and machine so used as aforesaid, in violation of the rights of your orators, contains, embodies, and uses the following features, that is to say:

1. A portable and adjustable dam, constructed and arranged in sliding telescopic sections.

And that the construction and arrangement thereof is substantially that described and claimed in the aforesaid letters-patent.

2. The combination of self-anchors, or, in other words, self-adjusting supports with the dam.

And that the said parts are combined in substantially the same manner and for the purposes as set forth and claimed in the aforesaid letters-patent.

3. The combination of a boat or boats with the said dam.

And also that the said parts are combined in substantially the manner and for the purposes set forth in the aforesaid letters-patent.

And also substantially the same arrangement of anchors to hold such boats in position, all substantially as set forth in the aforesaid letters-patent and claimed therein.

4. The combination and arrangement of windlasses, chains, and boats with the dam.

And also that such combination and arrangement is substantially the

same as described and claimed in the aforesaid letters-patent, and for the same purpose.

5. The invention or improvement set forth in the aforesaid letters-patent specified in the first claim thereof.

8 6. The invention or improvement set forth in the aforesaid letters-patent specified in the second claim thereof.

7. The invention or improvement set forth in the aforesaid letters-patent specified in the third claim thereof.

8. The invention or improvement set forth in the aforesaid letters-patent specified in the fourth claim thereof.

And your orators further show unto your honors that the said defendants have been duly notified of the said infringement, and have been requested to desist and refrain therefrom, and to account with and pay over to your orators the profits and damages which have accrued from such infringement; but they have refused to desist or refrain therefrom, or to pay over to your orators the profits they have made thereby, or the damages suffered by your orators therefrom, but continue still, and since said notice, in the said harbor of New York, and elsewhere in the United States, to use the said machine and still-water dam constructed according to the said letters-patent, and embodying and using the invention set forth and claimed therein, and substantial and material parts thereof, in violation of the aforesaid rights of your orators; all which aforesaid actings and doings of the said defendants are contrary to equity and good conscience, and tend to the great and irreparable injury of your orators.

And your orators further show unto your honors that the public have generally acquiesced in the aforesaid rights of your orators, and have abstained from infringing or violating the same, and that your orators have good and reasonable grounds to believe that if infringement by the said defendants and their confederates shall be prevented, they shall be able to derive very great gains and profits from the said invention, and their rights thereto will be universally respected.

9 To the end, therefore, that the defendants may, if they can, show why your orators should not have the relief hereby prayed, and may, upon their several and respective corporal oaths, and according to their best and utmost knowledge, information, and belief, full, true, direct, and perfect answer make to the premises, and to all the several matters hereinbefore stated and charged, and that the said defendants, and each of them, may be required to answer, in manner aforesaid, the several interrogatories hereunder written, and each of them, that is to say:

1. Whether or not the said defendant John Newton, since the date of the aforesaid letters-patent, caused to be constructed, or ordered the construction of, any machine or apparatus which has been used in drilling rock, or in connection with drilling rock, at Diamond Reef or Coenties Reef, in the harbor of New York?

2. Whether or not any such, or any machine or apparatus, was put in operation, or used by or under his direction, since the date of the aforesaid letters-patent, at the said Diamond or Coenties Reefs, in drilling rock, or in connection with drilling rock?

3. Whether or not the said defendants, Washington Issetts, Charles Eccleston, and William L. Quinn, or either and which, have at any time, since the date of the aforesaid letters-patent, been engaged in the operation of any machine used in drilling rock, or in connection with drilling rock at the said Diamond or Coenties Reef, and whether they,

or either of them, and which, have been engaged in the direction of the operation of the same?

4. Whether or not such machine or apparatus used upon Diamond and Coenties Reefs is the one caused to be constructed by the said Newton or under his direction?

5. Whether or not such machine contains or did contain a dam or enclosure for checking or breaking the force of the current?

6. Whether or not such dam or enclosure is or was portable—that is to say, capable of being removed from place to place?

7. Whether or not such dam or enclosure is or was adjustable vertically?

8. Whether or not, in such dam or enclosure, one section is or was made capable of sliding or being slid vertically inside or outside of another section?

9. In what respect, if any, the said dam or enclosure differed or differs from the construction and arrangement of a portable and adjustable dam in sliding or telescopic sections, described and claimed in the aforesaid letters-patent?

10. Whether or not self-anchors or self-adjusting supports were or are attached to the dam or enclosure contained in the said machine, used as aforesaid, and whether or not they were or are substantially the same in their construction and mode of operation as those described in the said letters-patent, and mentioned in the second claim thereof, or how otherwise?

11. Whether or not there was or is combined with the said dam or enclosure, in the said machine, any boat, support, or float, and whether such combination was substantially the same as described in the aforesaid letters-patent, or how otherwise?

12. Whether or not, in such machine or apparatus, or in the use thereof, there was or is any arrangement of anchors to hold such boats, or any such boat, support, or float, in position, and whether or not such arrangement was substantially the same, and operated in the same manner, to that described in the aforesaid letters-patent, or how otherwise?

13. Whether or not, in such machine or apparatus, there is or was a combination and arrangement of windlasses, chains, and boats with the dam, by which a series of drills may or might be operated within and enclosed by the dam, and whether such combination and arrangement is the same as that described in the aforesaid letters-patent and referred to in the fourth claim thereof, or how otherwise?

14. Whether or not the said defendant John Newton devised the construction of the said dam or apparatus?

15. Whether or not the said defendant John Newton caused the construction of the said dam or apparatus?

16. Whether or not the said defendant Newton furnished a plan and instructions for the construction of the said dam or apparatus?

17. Whether or not the said defendant Newton procured or ordered material for the construction of the said dam or apparatus?

18. Whether or not the said defendant Newton superintended the construction of the said dam or apparatus?

19. Whether or not the said defendant Newton directed the construction of the said dam or apparatus?

20. Whether or not the said defendant Newton has superintended the use of the said dam, or machine, or apparatus?

21. Whether or not the said defendant Newton has employed persons to work in the use of the said dam or machine?

22. Whether or not persons employed in the use of the said machine or apparatus have been paid by direction of the said Newton?

23. Whether or not the said defendant Newton has claimed to be the inventor of the said dam or apparatus?

24. Whether or not the said defendant Newton has claimed or represented that he had to turn inventor in constructing the said dam or apparatus.

12 25. Whether or not the said dam or apparatus was constructed by and under the direction and orders of the said defendant Newton?

26. Whether or not the said dam or apparatus was put into practice, operation, or use, by or under the order or direction of the said defendant Newton?

27. Whether or not the use of the said dam or apparatus has been continued under the order or direction of the said defendant Newton?

28. Whether or not the use of the said dam or apparatus is still continued under the order or direction of the said defendant Newton?

29. Whether or not the said defendants, Issetts, Eccleston, and Quinn, or either of them, and which, are now engaged in the operation, or the direction of the operation, and which, of the said machine or still-water dam?

30. Whether or not the said defendants, the said Issetts, Eccleston, and Quinn, or either of them, and which, were engaged in putting the said dam or machine into operation and use?

31. Whether or not the said defendants, the said Issetts, Eccleston, and Quinn, have been engaged in the operation and use of the said dam or machine, or in the direction thereof, ever since the same went into use, or how otherwise?

And that the said defendants may be decreed to account with, and pay over to, your orators the profits which they have or may have made from the making and use of the said patented invention, and the damages suffered by your orators therefrom, and that the said defendants may be enjoined, by the order and injunction of this honorable court, from making, constructing, using, or selling to others to be used, the said invention, or any part thereof, or any still-water dam, apparatus, device, or machine containing the same, or in any manner work-

13 ing, delivering, putting into practice, operation, or use the said invention or any part thereof, or any still-water dam or apparatus containing the same, or in any manner infringing the said letters patent, and that your orators may have such other and further relief as shall be agreeable to equity.

May it please your honors to grant unto your orators the writ of injunction issuing out of and under the seal of this honorable court, directed to the said defendants, the said John Newton, Washington Issetts, Charles Eccleston, and William L. Quinn, enjoining them, their agents, attorneys, clerks, confederates, servants, and workman, and each and every of them, from making, using, or vending to others to be used, the said invention, or any part thereof, or any still-water dam, apparatus, machine, or device containing the same, or like or similar to that which they have heretofore constructed and used in infringement of the aforesaid letters-patent, or in any manner infringing the aforesaid letters-patent.

May it please your honors to grant unto your orators the writ of subpœna ad respondendum, issuing out of and under the seal of this honorable court, directed to the said defendants, the said John Newton, Washington Isetts, Charles Eccleston, and William L. Quinn, command-

ing them, by a certain day therein to be named, and under a certain penalty, to be and appear in this honorable court, then and there to answer to the premises, and to stand to, perform, and abide such further order, direction, and decree as may be made against them.

And your orators, as in duty bound, will ever pray, &c.

WILLIAM H. CAMMEYER.
SAMUEL LEWIS.

THOS. P. HOW,
Solicitor and of Counsel for Complainants.
GEO. GIFFORD,
Of Counsel for Complainants.

14 The defendants, and each of them, are required to answer specially the foregoing interrogatories, respectively numbered 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, and 31, and each of them.

THOS. P. HOW,
Solicitor for Complainants.

UNITED STATES OF AMERICA,
Southern District of New York, ss :

William H. Cammeyer and Samuel Lewis, being severally duly sworn, each for himself, says they are the complainants named in the foregoing bill of complaint; that he has read the same, and knows the contents thereof, and that the same is true of his own knowledge, except as to those matters which are therein stated on information and belief, and as to those matters he believes it to be true.

WM. H. CAMMEYER.
SAMUEL LEWIS.

Sworn to before me this 25th day of July, 1872.

JOHN A. SHIELDS,
U. S. Commissioner S. D. of N. Y.

15 Circuit court of the United States for the southern district of New York.

WILLIAM H. CAMMEYER AND SAMUEL LEWIS
against
JOHN NEWTON, WASHINGTON ISETTS, CHARLES Eccleston, and William L. Quinn. } In equity.

The separate amended answer of John Newton, one of the defendants above named, replying to the bill of complaint of the above-named plaintiffs, respectfully shows to this court—

That as to the averments and allegations in the said bill of complaint contained that the plaintiff Samuel Lewis is the original and first inventor of a new and useful improved still-water dam; that said Lewis made due and timely application to the Commissioner of Patents of the United States for letters-patent therefor; that said Lewis assigned all his right, title, and interest in and to said alleged invention to the plaintiff William H. Cammeyer; that upon said application and assignment letters-patent of the United States were in due form of law granted, issued, and delivered to said William H. Cammeyer for such an invention; that the said plaintiff William H. Cammeyer sold, conveyed, and transferred to the plaintiff the said Samuel Lewis one equal undivided

half part of any and all claims and rights of action which might have theretofore accrued to him, the said William H. Cammeyer, for any infringement or infringements of the aforesaid alleged letters-patent, or from the working, use, or sale of the said alleged invention;
16 and that the said plaintiffs are now the owners of the said alleged letters-patent and of the rights secured thereby; as to each and every and all of such statements, allegations, and averments this defendant says that he has no knowledge or information thereof sufficient to ground a belief, and that he therefore denies the same, and each and every of them.

And this defendant, further answering, denies that the said alleged invention of the said plaintiffs is of great utility and value, and he avers and offers to show, by the leave of this court, that the same is utterly worthless and of no value whatever, and that no gains or profits ever can be realized to the said plaintiffs from the use or application thereof.

And this defendant, further answering, denies that he has, as alleged in the said bill of complaint, at the times and places in the said bill of complaint specified, or at any other time or place whatsoever, made, constructed, or used any machine and still-water dam containing the said alleged invention of the plaintiffs, or any substantial or material parts thereof; and he further denies that he is now using the same, and threatens to continue so to do, and he denies that the plaintiffs have suffered any damage by or through the use by this defendant of the machine or apparatus that said plaintiffs complain of this defendant for using; and he denies each and every allegation in that behalf in the said bill of complaint contained; and this defendant, further answering, denies that he, or any person acting for him or under his direction or control, has gained any advantage or profit from the inventing, making, constructing, or using the machine or apparatus for the inventing, making, constructing, and using which these plaintiffs complain against the defendants herein.

And this defendant Newton, further answering to the bill of complaint of the plaintiffs, herein shows to this honorable court that this defendant denies the allegation in the said bill that the said defendant originated and planned any infringement or violation of any pat-
17 ent owned by the plaintiffs herein, or that this defendant instigated and directed the construction of any still-water dam or machine made and used in violation of the rights of the plaintiffs herein; that this defendant denies that he caused or instigated the construction or furnished plans or instructions for the construction of any still-water dam or apparatus that in any way infringed upon or violated any alleged patent owned by or belonging to the plaintiffs herein; and this defendant, further answering, denies that he procured or ordered material for the construction thereof; that he employed men to work in the construction thereof; that he has superintended the construction of any such dam or machine as that last above referred to; that he has superintended the use thereof; that he has employed persons to work in the use thereof; that any persons who have been employed in the use thereof have been paid by his direction.

And this defendant, further answering, denies that he has ever claimed to be the inventor of a still-water dam or apparatus such as that described in the bill of complaint herein, or had to turn inventor in contriving it; or that any such so-called still-water dam or apparatus has ever at any time been constructed or put in practice by or under his order or direction; or that the use thereof has been continued and still is being continued by or under his order or direction; or that the de-

fendants, Washington Isetts, Charles Eccleston, and William L. Quinn, or either of them, ever has been or are now engaged in the operation or direction of the operation or use of any still-water dam or apparatus made and used as charged in the said bill of complaint in violation of the alleged rights of the plaintiffs herein.

And this defendant further shows to the court that the allegations in the said bill of complaint contained that this defendant, in devising or constructing any machine made and used by or under his orders or directions, caused drawings to be made of any model of any invention belonging to these plaintiffs, or that he at any time or for any purpose caused a model to be constructed from such model; or that he
18 obtained from the United States Patent-Office, or used in any manner, a copy of the specifications and drawings of any letters-patent of any alleged invention of the plaintiffs herein, all and each of them is wholly false and untrue.

And this defendant further shows to this court that during the year 1869 this defendant invented and devised a machine or apparatus for use as a caisson coffer-dam and diving-bell in excavating and taking out rock at Diamond Reef and Coenties Reef in the harbor of New York. And this defendant further shows to the court that the said caisson coffer-dam or diving-bell was constructed by and at the expense of the United States, and has been since used solely and exclusively by the said United States in the prosecution of the work undertaken by the United States of improving the harbor of New York, of which work the removal of the rock upon the reefs above mentioned is an important and material part, and that this defendant, being an officer of the United States and a lieut.-col. of engineers in the Army of the United States, has been heretofore assigned to the duty of managing and directing the said improvement of the harbor of New York, and that in pursuance of his aforesaid duty, and acting for the United States, he has used the said machine or apparatus, and has been engaged in excavating and removing rock upon the said Coenties and Diamond Reefs; and that the defendants Isetts, Eccleston, and Quinn are, and during all the time they or either of them have had any connection with the use or operation of the said machine or apparatus have been, employed in working the same—employed and paid by the United States—and have acted in connection therewith solely and entirely as employés and agents of the United States.

And this defendant, further answering, says that neither he or any or either of the defendants herein have derived or expect to obtain any profit, pay, or emolument of any nature or kind soever from the invention, construction, use, or operation of the said machine or apparatus.

And this defendant, further answering, on his information and
19 belief denies that the said machine or apparatus, being the said caisson coffer-dam or diving-bell, in any manner whatever conflicts with or infringes upon any invention or patent claimed or owned by the plaintiffs herein; and he denies—

1st. That it is a portable and adjustable dam constructed and arranged in sliding or telescopic sections, and that the construction and arrangement thereof is substantially that described and claimed in the letters-patent of the plaintiffs herein.

2d. He denies that in said caisson coffer-dam or diving-bell there is any combination of self-anchors or self-adjusting supports, or if there be any such parts that the same are combined in substantially the same manner and for the same purposes as set forth and claimed in the plaintiffs' alleged letters-patent.

3d. He denies that there is any combination of a boat or boats with the said caisson coffer-dam or diving-bell, or that any boat or boats are used or combined therewith in any manner or for any purposes similar to those set forth in the alleged letters-patent of the plaintiffs herein, and he also denies that there is any arrangement of anchors in a manner similar to or resembling that set forth in the said alleged letters-patent of the plaintiffs herein.

4th. He denies that there is any combination of windlasses, chains, and boats in connection or combined with the caisson coffer-dam or diving-bell invented by this defendant, or that there is any such resembling or similar to that described or claimed in the said alleged letters-patent of these plaintiffs, or designed for any similar purpose.

And as to the other allegations made by the plaintiffs in their bill of complaint, that the invention of this defendant is similar to or infringes upon the machine or apparatus described in certain alleged letters-patent claimed by these plaintiffs, this defendant has no knowledge or information concerning said letters-patent, and he therefore denies each and every of such allegations.

20 And this defendant, upon his information and belief, denies the allegation that he has ever been duly notified to desist and refrain from constructing, using, and operating the caisson coffer-dam or diving-bell so invented, constructed, and used by him as aforesaid.

And he further denies that the public have generally acquired in the rights of the plaintiffs herein under the said alleged patent, and he denies that the said alleged invention of the plaintiffs could be made profitable or valuable, or that the same could be put into practical operation.

Plaintiffs have never made, constructed, or put into operation any machine under their said alleged patent; and he offers to show and prove to this court that the said alleged invention of the said plaintiffs is no new invention whatever, but is composed and made up from designs and plans and upon principles that have been long and well known to the world, and especially to engineers and persons engaged in submarine work, and that were public and generally used and now free to be used by any and all persons long prior to the time the said plaintiffs claim to have invented the same.

And this defendant, further answering, saith, that the following are his answers to the interrogatories propounded in the said bill of complaint, and form part and are to be taken as a portion of his answer to the said bill of complaint, so far as the same are relevant or pertinent thereto.

To the first interrogatory he saith: Yes; acting as an officer of the United States, in its service, as before stated.

To the second interrogatory he saith: Yes; acting as an officer of the United States, in its service, as before stated.

To the third interrogatory he saith: As to the defendant Isetts,
21 not to my knowledge. As to the defendant Eccleston, he has been so engaged, and now is, since March 16th, 1872. The defendant Quinn has been so engaged in the operations referred to up to the 3d of October, 1872, when he ceased to work upon said machine; both in the employ of the United States.

To the fourth interrogatory he saith: Yes.

To the fifth interrogatory he saith: It contains no dam or enclosure such as that inquired of, as defendant understands and believes.

To the sixth interrogatory he saith: The machine or apparatus used by defendant can be removed from place to place when not in operation.

To the seventh interrogatory he saith: The dam or enclosure is not adjustable vertically.

To the eighth interrogatory he saith: No.

To the ninth interrogatory he saith: Not knowing the construction of the dam said to be described in the alleged letters-patent of the plaintiffs, he is unable to answer this interrogatory.

To the tenth interrogatory he saith: No self-anchors, or anchors of any kind, are used as inquired of. No self-adjusting supports are used. As to the other matters inquired of, defendant has no knowledge.

To the eleventh interrogatory he saith: There is no boat, support, or float combined with the said dam or enclosure.

22 To the twelfth interrogatory he saith: If at any time a boat should be required, such boat is anchored in the ordinary and usual manner of anchoring vessels. As to the other matters inquired of, defendant has no knowledge.

To the thirteenth interrogatory he saith: There is no combination or arrangement of windlasses, chains, and boats, with the dam, by which a series of drills may or will be operated within and enclosed by the dam. As to the other matters inquired of, defendant has no knowledge.

To the fourteenth interrogatory he saith: Yes; as an officer of and for the United States Government.

To the fifteenth interrogatory he saith: Yes; as an officer of and for the United States Government.

To the sixteenth interrogatory he saith: Yes; as an officer of and for the United States Government.

To the seventeenth interrogatory he saith: Yes; as an officer of and for the United States Government.

To the eighteenth interrogatory he saith: Yes; as an officer of and for the United States Government.

To the nineteenth interrogatory he saith: Yes; as an officer of and for the United States Government.

23 To the twentieth interrogatory he saith: Yes; as an officer of and for the United States Government.

To the twenty-first interrogatory he saith: Yes; as an officer of and for the United States Government.

To the twenty-second interrogatory he saith: Yes; as an officer of and for the United States Government.

To the twenty-third interrogatory he saith: Yes; as an officer of and for the United States Government.

To the twenty-fourth interrogatory he saith: Yes.

To the twenty-fifth interrogatory he saith: Yes; as an officer of and for the United States Government.

To the twenty-sixth interrogatory he saith: Yes; as an officer of and for the United States Government.

To the twenty-seventh interrogatory he saith: Yes; as an officer of and for the United States Government.

To the twenty-eighth interrogatory he saith: Yes; as an officer of and for the United States Government.

To the twenty-ninth interrogatory he saith: The defendant is now engaged in directing the operation of the said machine or apparatus. The other defendants are not employed in connection therewith.

24 To the thirtieth interrogatory he saith: The defendant Quinn was so engaged.

To the thirty-first interrogatory he saith: Eccleston has been engaged in the direction of the operation since April, 1872. Quinn was employd in operating from until

And this defendant, further answering to the said bill of complaint herein, and for a further and separate defense, avers that in the year

1867, at or near the city of Boston, in Boston Harbor, and in the State of Massachusetts, one George W. Townsend, now residing in Boston, Massachusetts, aforesaid, practiced and put in operation a system or method of drilling and blasting rock under water in a rapid tide-way, using therefor a drilling-platform supported by anchors and adjustable legs combined with a boat and a system of windlasses, anchors, and chains, together with suitable machinery by means of and through which a series of drills might be operated, substantially like the machine or apparatus claimed by the plaintiffs herein, and in the year aforesaid, and at the place aforesaid, used and operated the said machine and combination of machines and appliances as above described, and exhibited the same to others.

And this defendant, for a further answer to the said bill of complaint, and for a further and separate defense, avers that the machine or apparatus referred to and mentioned in the said bill of complaint as having been patented by the complainants herein, with the combinations, appliances, and machinery thereof, and the said portable, adjustable, still-water dam alleged by these complainants to have been invented by the said Lewis, was not in truth or fact the invention of said Lewis, but that the same had been invented and described by the defendant Newton herein for more than a year previous to the said invention thereof by the complainant Lewis and the date of his said letters-patent, and that such invention and the description thereof were printed and published in a public print of general circulation, to wit, in a certain letter of the Secretary of War of the United States, addressed to the House of Representatives in Congress of the United States, dated Washington, February 11, 1867, containing a report made by this defendant, which said report gave a full and complete description of said machine so invented by this defendant, together with the mode of constructing and of using and of operating the same, which said letter and report were, on the 14th day of February, 1867, ordered by said House of Representatives to be printed, and were then and there, at Washington aforesaid, printed and published, and are known as Executive Document No. 90, House of Representatives, second session, 39th Congress.

And this defendant, further answering, and for a further and separate defense to this action, avers and offers to show to this court that the machine or apparatus described and set forth in the said letters-patent of the complainants herein, and claimed and alleged by them to have been invented by said Lewis, was in truth and fact invented by and discovered by the defendant Newton, and that the said Lewis unjustly and surreptitiously obtained a patent for the said machine or apparatus which was in fact invented and discovered by the said Newton, who was using reasonable diligence in adapting and perfecting the same.

And therefore this defendant demands judgment against the said plaintiffs, and each of them, and prays that this honorable court will grant a dismissal of the said bill of complaint, and will deny the writ of injunction therein prayed for, with costs.

And this defendant, your orator, will ever pray, &c.

JOHN NEWTON,
Defendant.

NOAH DAVIS,
Solicitor and of Counsel for Defendant Newton.

26 UNITED STATES DISTRICT COURT,
Southern District of N. Y., ss:

John Newton, being duly sworn, says that he is one of the defendants named in the above-entitled action; that he has read the foregoing answer and knows the contents thereof; and that the same is true of his own knowledge, except as to the matters therein stated on information and belief; and as to these matters he believes it to be true.

JOHN NEWTON.

Sworn to before me this 4th day of March, 1873.

KENNETH G. WHITE,
U. S. Commissioner.

Circuit court of the United States for the southern district of New York.

WILLIAM H. CAMMEYER AND SAMUEL LEWIS
against
JOHN NEWTON, WASHINGTON ISETTS, CHARLES ECCLESTON, AND WILLIAM L. QUINN. } In equity.

The separate answer of Charles Eccleston, one of the above-named defendants, to the plaintiffs' bill of complaint herein respectfully shows to the court—

That as to the allegations in the said bill of complaint contained, concerning and respecting the issuing of letters-patent to the plaintiffs herein, or to either of them, or any transfers or assignments thereof, or any infringements thereof, or the details anp plans of any alleged invention by the said plaintiffs, or either of them, or the value and utility of such invention, or any infringement thereof by these defendants, or either or any of them, this defendant has no knowledge or information, and he therefore denies the same, and each and every of such allegations.

And this defendant, further answering, says that he knows that the defendant Newton has been and is now conducting and directing a machine or apparatus for excavating and removing rock at Diamond Reef and at Coenties Reef, in the harbor of New York, but that this defendant has no knowledge or information concerning the person or persons by whom the same was invented, designed, constructed, or put in operation, and that he therefore denies each and every allegation in the said bill of complaint contained relating thereto.

28 And this defendant, further answering, denies that he has ever been engaged, or now is engaged, in the planning, designing, constructing, or putting in operation the said so-called dam, machine, or apparatus, or that he has ever received therefrom, or therefor, any money, wages, salary, or any compensation or emolument, direct or indirect, whatsoever.

And this defendant, further answering, says that as an agent and employé of the United States Government, and as such solely, he has been since the day of March, 1872, until the present time, employed in directing and superintending the work of the removal of rock from Diamond Reef and Coenties Reef, in the harbor of New York, and in using the machine or apparatus there employed in such work, but that he denies that such machine or apparatus is any infringement upon or violation of any alleged patent owned or claimed by the plaintiffs herein.

And this defendant, further*ing* answering, says that the following are his answers to the interrogatories propounded by the plaintiffs herein in this said bill of complaint:

To the first interrogatory he saith: He knoweth not.

To the second interrogatory he saith: Yes.

To the third interrogatory he saith: He has been so employed as an agent or employé of the United States since.

To the fourth interrogatory he saith: He knoweth not.

To the fifth interrogatory he saith: It contains no dam or enclosure such as that inquired of, as defendant understands and believes.

29 To the sixth interrogatory he saith: The machine or apparatus used by defendant can be removed from place to place when not in operation.

To the seventh interrogatory he saith: The dam or enclosure is not adjustable vertical'y.

To the eighth interrogatory he saith: No.

To the ninth interrogatory he saith: Not knowing the construction of the dam said to be described in the alleged letters-patent of the plaintiffs, he is unable to answer this interrogatory.

To the tenth interrogatory he saith: No self-anchors or anchors of any kind are used. No self-adjusting supports are used. As to the other matters inquired of defendant has no knowledge.

To the eleventh interrogatory he saith: There is no boat, support, or float combined with the said dam or enclosure.

To the twelfth interrogatory he saith: If at any time a boat should be required, such boat is anchored in the ordinary and usual way of anchoring vessels. As to the other matters inquired of, defendant has no knowledge.

To the thirteenth interrogatory he saith: There is no combination of windlasses, chains, and boats with the dam by which a series of drills may be operated within and enclosed by the dam. As to the other matters inquired of, defendant has no knowledge.

To the fourteenth interrogatory he saith: He knoweth not.

30 To the fifteenth interrogatory he saith: He knoweth not.

To the sixteenth interrogatory he saith: He knoweth not.

To the seventeenth interrogatory he saith: He knoweth not.

To the eighteenth interrogatory he saith: He knoweth not.

To the nineteenth interrogatory he saith: He knoweth not.

To the twentieth interrogatory he saith: He knoweth not.

To the twenty-first interrogatory he saith: He knoweth not.

To the twenty-second interrogatory he saith: He knoweth not.

To the twenty-third interrogatory he saith: He knoweth not.

To the twenty-fourth interrogatory he saith: Yes.

To the twenty-fifth interrogatory he saith: He knoweth not.

To the twenty-sixth interrogatory he saith: He knoweth not.

To the twenty-seventh interrogatory he saith: Yes.

31 To the twenty-eighth interrogatory he saith: Yes.

To the twenty-ninth interrogatory he saith: This defendant alone, of these inquired of, is engaged on said machine or apparatus.

To the thirtieth interrogatory he saith: He knoweth not.

To the thirty-first interrogatory he saith: He knows nothing of any such employment of Isetts. Quinn was employed on said dam when defendant came to work there, and left on or about the 3d day of September, 1872.

Wherefore this defendant demands judgment against the said plaintiffs for a dismissal of their said complaint, and for a denial of the writ

of injunction prayed for by the said plaintiffs, together with the costs of this action.

And this defendant, your orator, will ever pray, &c.

(Signed) CHAS. A. ECCLESTON.

NOAH DAVIS,
Solicitor, and of Counsel for Defendant Eccleston.

U. S. CIRCUIT COURT,
Southern District of New York, ss:

Charles A. Eccleston, being duly sworn, says that he is one of the defendants in the above action; that he has read the foregoing answer and the answers to interrogatories therein contained, and knows
32 the contents thereof; and that the same are true of his own knowledge, except as to the matters therein stated on information and belief, and as to such matters he believes it to be true.

(Signed) CHAS. A. ECCLESTON.

Sworn to before me this 2d day of November, 1872.

JOHN A. SHIELDS,
U. S. Commissioner S. D. of N. Y.

33 Circuit court of the United States for the southern district of New York.

WILLIAM H. CAMMEYER AND SAMUEL LEWIS
against
JOHN NEWTON, WASHINGTON ISETTS, CHARLES A. Eccleston, and William L. Quinn. } In equity.

The separate answer of Washington Isetts, one of the above-named defendants, to the plaintiffs' bill of complaint, herein respectfully shows to this court—

That as to the allegations in the said bill of complaint contained, concerning and respecting the issuing of letters-patent to the plaintiffs herein, or to either of them, or any transfers or assignments thereof, or any infringements thereof, or the details and plans of any alleged invention by the said plaintiffs, or either of them, or the value and utility of such invention, or any infringement thereof by these defendants, or either or any of them, this defendant has no knowledge or information, and he therefore denies the same and each and every of such allegations.

And this defendant, further answering, says that he knows that the defendant Newton has been and is now conducting and directing a machine or apparatus for excavating and removing rock at Diamond Reef and at Coenties Reef, in the harbor of New York, but that he has no knowledge or information concerning the person or persons by whom the same was invented, designed, constructed, or put in operation,
34 and that he therefore denies each and every allegation in the said complaint contained relating thereto.

And this defendant, further answering, denies that he ever has been or now is engaged in the planning, designing, constructing, putting in operation, operating or directing, or in any manner concerned with the making or operation of the said so-called dam or apparatus, or that he has ever received therefrom or therefor any money, wages, salary, or any compensation, direct or indirect, whatsoever.

And this defendant, further answering, says that the following are his answers to the interrogatories propounded by the plaintiffs in their bill of complaint, and he prays that the same may be taken as and form a part of his answer to the said bill of complaint—

To the first interrogatory he saith: He knoweth not.

To the second interrogatory he saith: Yes.

To the third interrogatory he saith: I have not been so employed and am not now.

To the fourth interrogatory he saith: He knoweth not.

To the fifth interrogatory he saith: It contains a partial enclosure.

To the sixth interrogatory he saith: The machine or apparatus can be moved from place to place when not in operation.

To the seventh interrogatory he saith: Before it was put in operation it could be adjusted vertically to the height needed. There was
35 no provision for adjusting it vertically or otherwise when placed in position for operating.

To the eighth interrogatory he saith: No.

To the ninth interrogatory he saith: He knoweth not.

To the tenth interrogatory he saith: No self-anchor or anchors of any kind are used as inquired of. No self-adjusting are used. As to the other matters inquired of defendant has no knowledge.

To the eleventh interrogatory he saith: There is no boats, support, or float combined with the said dam or enclosure.

To the twelfth interrogatory he saith: If a boat is used to assist in the working of the said machine, such boat is anchored in the ordinary and usual manner of anchoring vessels. As to the other matters inquired of defendant has no knowledge.

To the thirteenth interrogatory he saith: There is no combination or arrangement of windlasses, chains, and boats with the dam by which a series of drills might be operated within and enclosed by the dam. As to the other matters inquired of defendant has no knowledge.

To the fourteenth interrogatory he saith: He knoweth not.

To the fifteenth interrogatory he saith: He knoweth not.

To the sixteenth interrogatory he saith: He knoweth not.

36 To the seventeenth interrogatory he saith: He knoweth not.

To the eighteenth interrogatory he saith: He knoweth not.

To the nineteenth interrogatory he saith: He knoweth not.

To the twentieth interrogatory he saith: Yes.

To the twenty-first interrogatory he saith: Yes.

To the twenty-second interrogatory he saith: Yes.

To the twenty-third interrogatory he saith: Yes.

To the twenty-fourth interrogatory he saith: He knoweth not.

To the twenty-fifth interrogatory he saith: He knoweth not.

To the twenty-sixth interrogatory he saith: Yes.

To the twenty-seventh interrogatory he saith: Yes.

To the twenty-eighth interrogatory he saith: Yes.

37 To the twenty-ninth interrogatory he saith: That he is not engaged in the working of said machine, nor is defendant Quinn.

To the thirtieth interrogatory he saith: That he was not engaged in putting the said machine in operation. As to the others he knoweth not.

To the thirty-first interrogatory he saith: None of the defendants named have been so engaged to his knowledge.

Wherefore this defendant demands judgment against the plaintiffs for a dismissal of their bill of complaint herein, and for a denial of the writ of injunction prayed for by said plaintiffs, and for the costs of this action.

And this defendant, your orator, will ever pray, &c.

(Signed) WASHINGTON ISETTS.

NOAH DAVIS,
Solicitor and of Counsel for Defendant Isetts.

U. S. CIRCUIT COURT,
Southern District of New York, ss:

Washington Isetts, the above-named defendant, being duly sworn, says that he has read the foregoing answer, that the answers to the plaintiffs' interrogatories therein contained; that he knows the contents thereof, and that the same are true of his own knowledge, except as to the matters therein stated on information and belief, and as to such matters he believes it to be true.

(Signed) WASHINGTON ISETTS.

Sworn to before me this 2d day of November, 1872.

JOHN A. SHIELDS,
U. S. Commissioner S. D. of N. Y.

38 Circuit court of the United States for the southern district of New York.

WILLIAM H. CAMMEYER AND SAMUEL LEWIS
against
JOHN NEWTON, WASHINGTON ISETTS, CHARLES A. Eccleston, and William L. Quinn. } In equity.

The separate answer of William L. Quinn, one of the above-named defendants to the plaintiffs' bill of compaint, herein respectfully shows to this court—

That as to the allegations in the said bill of complaint contained, concerning and respecting the issuing of letters-patent to the plaintiffs herein, or to either of them, or any transfers or assignments thereof, or any infringements thereof, or the details and plans of any alleged invention by the said plaintiffs, or either of them, or the value and utility of any such invention, or any infringement thereof by these defendants, or any or either of them, this defendant has no knowledge or information, and he therefore denies the same and each and every of such allegations.

And this defendant, further answering, says that he knows that the defendant Newton has been, and is now, conducting and directing a machine or apparatus for excavating and removing rock at Diamond Reef and at Coenties Reef in the harbor of New York, but that he has no knowledge or information concerning the person or persons by whom the same was invented, designed, constructed, or put in operation, and that therefore he denies each and every allegation in the said complaint contained relating thereto.

39 And this defendant, further answering, denies that he ever has been, or now is, engaged in the planning, designing, constructing, putting in operation, operating, or directing, or in any manner concerned with the working or operation of the said machine or apparatus, or that he has received therefrom or therefor any money, wages, salary, or any compensation, direct or indirect, whatsoever.

And this defendant, further answering, says that the following are his answers to the interrogatories propounded by the plaintiffs in their bill of complaint, and he prays that the same may be taken as and form a part of his answer to the said bill of complaint.

To the first interrogatory he saith: He knoweth not.

To the second interrogatory he saith: Yes.

To the third interrogatory he saith: I worked as a diver while this machine or apparatus was being used, from November 6, 1870, until Sep-

tember 3, 1872. Isetts never worked there. Eccleston was employed managing it since about April, 1872.

To the fourth interrogatory he saith: I know nothing of the construction of the machine.

To the fifth interrogatory he saith: No.

To the sixth interrogatory he saith: It can be moved.

To the seventh interrogatory he saith: It is not.

40 To the eighth interrogatory he saith: No.

To the ninth interrogatory he saith: He knoweth not.

To the tenth interrogatory he saith: No self-anchors or self-adjusting supports are used. He knows nothing of those described in plaintiffs' patent.

To the eleventh interrogatory he saith: There is no boat, support, or float combined with the machine or apparatus.

To the twelfth interrogatory he saith: If at any time a boat should be required, such boat is anchored in the usual and ordinary manner of anchoring vessels.

As to the other matter inquired of he knows nothing.

To the thirteenth interrogatory he saith: No. He knows nothing of plaintiffs' patent.

To the fourteenth interrogatory he saith: He knoweth not.

To the fifteenth interrogatory he saith: He knoweth not.

To the sixteenth interrogatory he saith: He knoweth not.

To the seventeenth interrogatory he saith: He knoweth not.

To the eighteenth interrogatory he saith: He knoweth not.

41 To the nineteenth interrogatory he saith: He knoweth not.

To the twentieth interrogatory he saith: He knoweth not.

To the twenty-first interrogatory he saith: Yes.

To the twenty-second interrogatory he saith: Yes.

To the twenty-third interrogatory he saith: He knoweth not.

To the twenty-fourth interrogatory he saith: He knoweth not.

To the twenty-fifth interrogatory he saith: He knoweth not.

To the twenty-sixth interrogatory he saith: Yes.

To the twenty-seventh interrogatory he saith: Yes.

To the twenty-eighth interrogatory he saith: He knoweth not.

To the twenty-ninth interrogatory he saith: He knoweth not.

To the thirtieth interrogatory he saith: This defendant was employed as a diver at the time the said machine or apparatus was put in operation. Neither Isetts nor Eccleston were so engaged.

42 To the thirty-first interrogatory he saith: I have been employed as a diver since November 6, 1870; left work October 3, 1872. Eccleston came to work April, 1872. Isetts was never so employed, to defendant's knowledge.

Wherefore this defendant demands judgment against the said plaintiffs for a dismissal of their said bill of complaint, and for a denial of the writ of injunction prayed for by the said plaintiffs, and for the costs of this action.

And this defendant, your orator, will ever pray, &c.

(Signed) WILLIAM LAWRENCE QUINN.

NOAH DAVIS,
Solicitor and of Counsel for Deft. William L. Quinn.

U. S. CIRCUIT COURT,
Southern District of N. Y., ss:

William L. Quinn, being duly sworn, says that he is one of the defendants in the above-entitled action; that he has read the foregoing

answer and answers to interrogatories, and knows the contents thereof, and that the same are true, of his own knowledge, except as to the matters therein stated on information and belief, and as to such matters he believes it to be true.

WILLIAM LAWRENCE QUINN.

Sworn to before me this 2d day of November, 1872.
(Signed) JOHN A. SHIELDS,
U. S. Commissioner S. D. of N. Y.

43 Circuit court of the United States for the southern district of New York.

WILLIAM H. CAMMEYER AND SAMUEL LEWIS
vs.
JOHN NEWTON, WASHINGTON ISETTS, CHARLES Eccleston, and William L. Quinn. } In equity.

The replication of William H. Cammeyer and Samuel Lewis, complainants, to the answer of John Newton, one of the defendants:

These repliants, saving and reserving unto themselves all and all manner of advantage of exception to the manifold insufficiencies of the said answer, for replication thereunto, say that they will aver and prove their said bill to be true, certain, and sufficient in the law to be answered unto; and that the said answer of the defendant is uncertain, untrue, and insufficient to be replied unto by these repliants; without this, that any other matter or thing whatsoever in the said answer contained material or effectual in the law to be replied unto, confessed, and avoided, traversed or denied, is true. All which matters and things these repliants are and will be ready to aver and prove as this honorable court shall direct, and humbly pray as in and by their said bill they have already prayed.

THOS. P. HOW,
Solicitor for Complainants.

[Same replication as to answer of each of defendants, all filed November 4, 1872.]

44 Circuit court of the United States for the southern district of New York. In equity.

WILLIAM H. CAMMEYER AND SAMUEL LEWIS
vs.
JOHN NEWTON, WASHINGTON ISETTS, CHARLES Eccleston, and William L. Quinn. } Stipulation.

It is stipulated and agreed that the replication to the original answer of the defendant Newton, in the above-entitled suit, stand and be deemed a replication to his amended answer therein.

New York, March 7, 1873.

NOAH DAVIS,
Solicitor for Defendants.

45 U. S. circuit court for the southern district of New York. In equity.

WILLIAM H. CAMMEYER AND SAMUEL LEWIS
against
JOHN NEWTON, WASHINGTON ISETTS, CHARLES Eccleston, and William L. Quinn.

Proof taken on the part of the complainants in this cause, under and pursuant to the 67th rule in equity, before me, Joseph Gutman, jr., examiner.

NEW YORK, *Dec.* 9, 1872—11 a. m.

Present: Thomas P. How, esq., counsel for complainants, and Henry E. Davies, esq., counsel for defendants.

Counsel for complainants offers in evidence a certified copy of the letters-patent No. 80492, granted to William H. Cammeyer, July 28, 1868, for improved portable and adjustable still-water dam, and the same is marked "Complainants' Exhibit A. J. G., jr., ex."

Counsel for complainants also offers in evidence an assignment from said Cammeyer to Samuel Lewis, of one equal undivided one-half part of the said letters-patent, complainants' Exhibit A, and of the invention therein set forth and claimed therein, and of any and all claims
46 and rights of action which had or might have accrued to him, the said Cammeyer, for any infringements of the said letters-patent; which assignment is dated April 11, 1872, and also certificate of recording the same endorsed thereon, and the same is marked "Complainants' Exhibit B. J. G., jr., ex."

JAMES H. STEVENS, a witness of lawful age, produced on the part of the complainants in this action, being by me first duly cautioned and sworn to testify the truth, the whole truth, and nothing but the truth, in the matter of controversy herein, and being examined by Mr. How, counsel for complainants, deposes and says as follows:

Q. 1. What is your name, age, residence, and occupation?

A. James H. Stevens. I am forty-eight years old. I reside at Greenpoint, L. I. I am a steam-boiler maker.

Q. 2. Where were you employed during the year 1869, and in what capacity and what business?

A. From about the middle of March until the middle of December, I was employed at the Novelty Iron Works as foreman of the boiler department.

Q. 3. Were you, at any time during the year 1869, employed or engaged in the construction of any apparatus, or part of any apparatus, for submarine operations; and, if so, what apparatus or parts, and on whose order was it constructed?

(Objected to as leading.)

A. At that time, in the summer and fall, and up to the time I left, I was engaged in building an apparatus similar to that model. I was employed by the Novelty Iron Works, and the apparatus was built under the supervision of General Newton.

(Counsel for complainants offers the model referred to by the witness in his last answer in evidence, and the same is marked "Complainants' Exhibit C. J. G., jr., ex.")

(Objected to by counsel for defendants as not having been identified.)

Q. 4. On whose order was it constructed?

47 A. I got my information from the draughtsman. I saw General Newton there giving instructions several times.

Q. 5. Who was the draughtsman from whom you received these instructions; and by whom was he employed?

A. I think his name was Kelly. He was employed by the Novelty Iron Works at that time; since, I believe, by Mr. Newton.

Q. 6. During the construction of the apparatus, about how often did you see General Newton there giving instructions, as you have stated?

A. I think I saw him once in the office, twice in the drawing-room, and once in the boiler-shop with Captain Trowbridge.

Q. 7. Please state what parts of the apparatus you made.

A. I superintended it—the telescope. The dome and the adjustable legs was done under my supervision; it is shown in the model, complainants' Exhibit C. The parts were made in different departments, and the machine was put together in the boiler-shop under my supervision. The adjustable legs were made, I think, at Bridgewater, Conn.

Q. 8. Please describe how the parts of this apparatus were constructed and put together to operate with relation to each other.

(Objected to as assuming that the witness knows.)

A. The adjustable legs and the telescope are the only things that I know about. They were adjusted the same as those in the model, Complainants' Exhibit C. The telescope worked up and down, the same as in the model, and it had catches on the same as this has got, and pawls, to adjust it.

Q. 9. Who worked with or under you in the construction of the apparatus, as you have stated?

A. Richard Stevens, my brother; James Flinter, and 30 or 25 others. I cannot mention all their names now.

Q. 10. After you had completed the work, of which you have testified, on this apparatus, what was then done with the apparatus?

48 A. The apparatus was not quite finished when I left there. It lay by the dock some time, probably two or three months, before they took it away.

Q. 11. Did you ever see the apparatus tried after the parts were pu together, either in whole or in part, to ascertain how it would work?

A. No; I saw it hoisted, raised, and lowered by the machinery.

Q. 12. Please explain more fully what you mean by your last answer.

A. That derricks were put on the screw, and the machine was hoisted and lowered by them.

Q. 13. What do you mean by the machine in your last answer—what parts were hoisted and lowered?

A. I saw the telescope hoisted and lowered, and I saw the whole dome hoisted and lowered.

Q. 14. In the apparatus you have described was there any provision for drills? If so, what provision?

A. There were cast-iron pipes bolted fast, inside and outside, to steady the drill, the same as that in the model, Exhibit C, and a wrought-iron ring fastened on the inside of the dome and the bottom of the pipes to steady them. That ring is in the model.

Q. 15. State in what particular, if any, in the apparatus you helped to construct, as you have testified, the devices or provisions for the drills differed from the model, complainants' Exhibit C.

A. I don't know as there was any difference. There may have been more drills in the model than were in the original dome, or there may not be as many. They were placed in the same position. There was

no centre-drill in the original when I saw it last, when I was working on it.

And being cross-examined:

X Q. 16. Have you ever seen the machine upon which you worked, concerning which you have testified, since the close of the year 1869?

A. I have.

X Q. 17. Where and when did you last see it?

A. Last winter, at Greenpoint.

49 X Q. 18. Did you examine it then?

A. Only what I could see from the dock.

X Q. 19. Where was the machine; on a boat?

A. On a scow.

X Q. 20. Did you go on board the scow to examine the machine?

A. No, sir.

X Q. 21. When did you first see this model, Exhibit C, now here?

A. I think it was last Friday evening.

X Q. 22. Where did you see it?

A. At my house in Greenpoint.

X Q. 23. Who brought it to your house?

A. Mr. Cammeyer, the plaintiff.

X Q. 24. Did you know or understand by whom it had been made or prepared?

(Objected to as immaterial.)

A. No, sir.

X Q. 25. Did you hear Mr. Cammeyer say anything in regard to the working of it?

(Objected to as immaterial.)

A. I think he told me that the man who made it had stayed up all the night before to finish it.

X Q. 26. Did he not say who the gentleman was who made it?

A. I think he mentioned his name, but I cannot recall now who it was.

X Q. 27. You are sure you cannot recollect the name?

A. I don't know the man's name.

X Q. 28. Do you know the man?

A. No; I can imagine.

X Q. 29. Give us the result of your imagination on the subject?

(Objected to as incompetent.)

A. I think it is the gentleman on my left, here. I don't know his name.

50 (Counsel for complainants states that the gentleman indicated is Mr. Lewis, one of the complainants.)

X Q. 30. Did this gentleman accompany Mr. Cammeyer to your house on Friday evening?

A. No, sir.

X Q. 31. Had you known Mr. Cammeyer before he called upon you on Friday evening?

A. I had seen him three times before, I think.

X Q. 32. State, as nearly as you can, the first time that you saw him.

A. I should think about two weeks ago.

X Q. 33. Did he come to see you then in reference to this model and this suit?

A. No, sir.

X Q. 34. What was the occasion of his first meeting with you?

A. He was looking for a man by the name of Rodman. He called at the Morgan Iron Works, and inquired of the watchman for a man by the

name of Rodman, that had worked on this dome; the watchman told him that there was no such man there, but thought that I knew something about it. He came into the shop and saw me, and inquired of me if I knew this man Rodman. I told him I did, but did not know where to find him; he inquired of me if I knew anything about this dome; I told him that I did, and he wanted me to make a rough sketch of it, as far as I could recollect; I told him that it was so long ago that I could hardly recollect about it without thinking about it, though I did make a rough sketch of it on a piece of iron or wood with a piece of chalk. I also told him that I could refer him to a man who could tell him as much about it, or more, than I could.

X Q. 35. Did you make him any other sketch than this rough one that you made on a piece of board or iron?

A. Not at that time.

X Q. 36. Did you at any other time before you gave testimony here to-day?

A. I don't think I did.

51 X Q. 37. Could you make a sketch or drawing of this machine that you worked upon, now that your memory has been thus refreshed here, without reference to this model before you?

A. Yes, sir.

X Q. 38. One in accurate proportion to the machine that you made?

A. Not exactly.

X Q. 39. Will you swear that the model here, Exhibit C, is a correct and accurate representation of the machine upon which you worked three years ago?

A. There may be some little points about it in which it differs.

X Q. 40. Did the machine upon which you worked three years ago have the same motion of the legs as represented upon that model, Exhibit C?

A. They moved up and down the same as that does—the telescope and legs both.

X Q. 41. Was there no other machinery or parts attached to the machine that you worked on other than is represented in the said model?

A. There were cams to hold the legs in place when they touched the bottom.

X Q. 42. Was the part in this model which you call the telescope in the same proportion to the original dome as it appears in this model?

A. I think it is.

X Q. 43. What was the height of the original dome that you worked upon?

A. The whole diameter of the dome was 30 feet. I think the height was about 13 feet.

X Q. 44. This part you call the telescope, how high was that?

A. About nine feet.

X Q. 45. Was there any arrangement in this machine that you made for working the telescope up and down?

A. Four cranes, that they had on deck, raised that as well as the dome; that could be raised separate from the dome, and the dome raised bodily.

X Q. 46. In the machine that you worked upon, was there anything arranged for working the telescope, as you call it, up and down?

52 A. I have just answered that question. I say that there were four cranes on the deck that raised that telescope up and down.

X Q. 47. Were there cranes on the deck of the scow-part of the machine built by you?

A. They were part and parcel of the machine, and they were not. You could disconnect them, and do other work with them, or you could connect them on.

X Q. 48. You did not build, or superintend the building of, these cranes and the scow, did you?

A. No, sir.

X Q. 49. In the machine that you built, or superintended the building of, was there any provision for raising or lowering the part that you call the telescope?

(Objected to as already twice answered.)

A. No; but there was provision made to hold it there when it was raised or lowered.

X Q. 50. What was that provision for holding it when it was in position?

A. A cast-iron ratchet and a wrought-iron pawl—four ratchets, I think, and four pawls.

X Q. 51. Do you know, except by hearsay, who ordered the manufacture of this machine?

A. I think I know.

X Q. 52. Did you receive the order for it.

A. Not direct from the parties that ordered it, but I heard the parties give the order for it.

X Q. 53. Who did you hear give orders for it?

A. Mr. Newton, one of the defendants.

X Q. 54. To whom did he give the orders?

A. To Captain Trowbridge.

X Q. 55. Who was Captain Trowbridge?

A. Secretary and Vice-President of the Novelty Iron Works.

X Q. 56. Do you know for whom General Newton ordered the machine to be made?

(Objected to as new matter.)

A. No, sir.

53 X Q. 57. Did you know that it was ordered for the United States Government, and paid for by the United States Government?

(Same objection.)

A. No, sir; I can't swear to that.

X Q. 58. Did you ever see the machine in operation or use?

A. No, sir; not any more than to try it at the works so as to adjust that dome and telescope—that was all.

X Q. 59. It was not put in operation at the works, was it?

A. Not that I know of; I was not there till it was finished entirely.

X Q. 60. You left before the thing was completed, then?

A. Yes.

X Q. 61. All that you saw then of the working of the machine was the adjustment of these parts before its completion, was it not?

A. Yes, sir.

X Q. 62. Do you know, except from what others have told you, for what this machine was designed, or for what it has been used?

A. No, sir.

And being further examined by Mr. How, he says:

R. D. Q. 63. Did either of the defendants, General Newton, Mr. Isetts, Mr. Quinn, or Col. Eccleston, tell you for what purpose this machine was designed, or for what it had been used?

A. No, sir; I think not.

JAS. H. STEPHENS.

Subscribed and sworn to before me this 9th day of December, 1872.
JOSEPH GUTMAN, JR.,
Examiner, &c.

Examination adjourned to December 11, 1872, at 11 a. m.
JOSEPH GUTMAN, JR.,
Commissioner.

54 DECEMBER 11th, 1872—11 a. m.

Present: Counsel for the respective parties.

RICHARD S. STEVENS, a witness of lawful age, produced on the part of the complainants, having been by me first duly cautioned and sworn to testify the truth, the whole truth, and nothing but the truth, in the matter of controversy herein, and being examined by Mr. How, deposes and says:

Q. 1. What is your name, residence, age, and occupation?

A. My name is Richard Scott Stevens; residence is 719 Ninth street, New York; I am 42 years old; and my occupation is that of boiler-maker.

Q. 2. Where were you employed during the year 1869; in what capacity and in what business?

A. I was employed in the Novelty Iron Works, in the boiler-shop, as a fitter-up of boilers.

Q. 3. Were you, at any time in the year 1869, engaged or employed in the construction of any apparatus or part of apparatus for submarine operations; and, if so, what apparatus or parts, and on whose order was such apparatus constructed?

(Defendants' counsel objects to the above interrogatory on the ground that it is immaterial, as witness is not shown to have had any connection with the defendants, or the apparatus concerning which the suit is brought.)

A. I was employed in the Novelty Iron Works.

(Defendants' counsel objects that the witness is not shown to possess any knowledge of the nature of apparatus for submarine operations.)

I think it was an apparatus they called the "dome." I do not know on whose order it was constructed.

Q. 4. At what time of the year 1869 did you commence to work on this apparatus, which you call the "dome?"

55 (Objected to, as it does not appear that the apparatus referred to by witness in his previous answer as the "dome" was an apparatus for submarine operations, or an apparatus ordered by the defendants, or the apparatus concerning which the suit is brought.)

A. I could not tell you exactly the time. It was about the middle of March, 1869, when I left there, and the job was not finished.

(Defendants' counsel objects to all but the first sentence of that answer, as not responsive to the interrogatory.)

Q. 5. Please look at the model, complainants' Exhibit C, now shown you, and state how the apparatus you worked on at the Novelty Works, as you have stated, in 1869, corresponds with or differs from the construction shown in said model.

(Objected to because it is not shown that the witness has any knowledge of the construction of the apparatus employed by defendant, and which is claimed to be an infringement of plaintiff's patents; also, because it is not shown that the model, Exhibit C, is a model of such apparatus, or of any apparatus concerning which his suit is brought;

also, because the witness identified that the apparatus called by him the "dome," which is alleged to have been in process of construction at the Novelty Iron Works, in 1869, was not finished when the witness, as he testifies, left the said works; also, because the said apparatus called the "dome" is not shown to have any connection with the apparatus of defendant, concerning which this suit is brought; also, because the witness is not shown to have any knowledge of submarine apparatus, nor to be qualified to testify concerning such apparatus.)

A. I worked on the "telescope," [taking hold of the part marked "A,"] and I worked on the "drops," [witness taking hold of the sliding-bars at the lower part of the dome-shaped portion of the apparatus;]

56 that is all I worked on; the part marked "A" in the model worked up and down in the apparatus the same as that does. I worked on the whole arrangement on the outside of the dome, [pointing to the part marked "B," by the examiner.] I worked on the ring to stationery them "pipes," [witness pointing to the ring a short distance from the bottom of the dome and inside portion thereof;] there is a ring about three feet from the top of the dome, or two feet and a half, held there by braces for the telescope to slide up and down in the inside of that ring to steady the telescope; then there is another ring on the bottom of that telescope for keeping that telescope from pulling out when you raise it; then there is another ring underneath this bell-crown of the telescope, measures, may be, somewhere about a three-inch ring; there is four of these ratchets and four bars, and then there was an angle-iron bar set on in top of that dome, [pointing to part of model marked "B;"] that angle-iron bar has got four notches cut out of it for these other four bars to slide up and down in; for the telescope to slide up and down in these notches. I helped to put these drops in. I helped to hoist them and lower them; by drops I mean the anchors, [witness points to the sliding-bars inside the lower portion of the dome.]

(Answer objected to by defendants' counsel as not responsive to the interrogatory; also, as not responsive except the sentence beginning, "the part marked "A" in the model.")

Q. 6. Did you ever see the telescope which, as indicated, marked "A" in the model, worked up and down in the front dome, or part marked "B" in the model in the machine which you say you worked on at the Novelty Works?

(Objected to as before, to the previous question.)

A. I saw the telescope worked up and down.

Q. 7. When and where?

A. Alongside of the Novelty Iron Works' docks. I could not tell exactly when, but it was while it was lying there.

57 Q. 8. During the time you were engaged in the construction of the apparatus at the Novelty Iron Works, did you ever see General Newton, one of the defendants, there?

(Objected to because it is not stated what apparatus is referred to in the interrogatory; and because it has not been shown that defendant, General Newton, was in any manner connected with said apparatus.)

A. I did, sir.

Q. 9. What was he doing there?

(Objected to as immaterial.)

A. That is more than I can tell you.

And being cross-examined by Mr. Irwin's counsel for defendant, he deposes and says:

X Q. 10. What was your business in the Novelty Iron Works?

A. Boiler-maker.

X Q. 11. Describe what you had to do as a boiler-maker there?
A. I was a fitter-up there.
X Q. 12. Describe what you had to do as a fitter-up of boilers there?
A. Plating, putting up sheets.
X Q. 13. In what way?
A. Punching holes, and fitting them up to the places and bolting them fast.
X Q. 14. Was that all the work on which you were employed there?
A. That was all the work at that present time; I was also employed on that dome there.
X Q. 15. Were you a foreman in that establishment?
A. I was not, sir; nothing but a journeyman.
X Q. 16. Was the work you did, on what you have called the dome, of the character you have described as done by you in that establishment?
A. I helped to do it, sir.
58 X Q. 17. How long were you employed upon that particular work?
A. I could not tell you exactly how long I was employed on it, sir.
X Q. 18. Can you give an idea of how long?
A. No, sir; I could not give any idea; I know it was about the middle of March when I left there, and that is all I know about it.
X Q. 19. Did you ever work before the time you have mentioned on any similar apparatus to that described by you as the dome?
(Objected to as new matter.)
A. No, sir.
X Q. 20. Have you ever since that time worked on any similar apparatus?
(Same objection.)
A. No, sir.
X Q. 21. Where have you been employed since leaving the Novelty Iron Works?
A. At the Morgan Iron Works.
X Q. 22. Have you been employed anywhere else?
A. At Samuel Lewis'.
X Q. 23. State every place at which you have been employed since leaving the Novelty Works?
A. I was employed at Buffalo, at King's, I believe; the Shepard Iron Works; no other place.
X Q. 24. Where are you employed now?
A. At the Morgan Iron Works.
X Q. 25. How long have you been there?
A. About two years.
X Q. 26. Have you been employed on the same work in all these places?
A. At boiler-work.
X Q. 27. In the same way as you have described your occupation at the Novelty Iron Works?
A. Well, at boiler-work. I worked on the dome, also, at the Novelty Iron Works. I worked at boiler-work, fitting up, the same as at the Novelty Iron Works.
X Q. 28. Do you know the plaintiffs in this action?
A. I do not, sir.
59 X Q. 29. Was there, in the apparatus called the dome, which you saw at the Novelty Iron Works, any part corresponding to the

parts running through the centre of the part marked A, and attached to the side thereof or the attachment, as shown in the model, Exhibit C?

A. There was not in my time.

X Q. 30. State whether the parts described by you in the model, Exhibit C, as drops, had anything corresponding thereto in the apparatus called the dome; and, if so, whether those parts in the dome slid freely up and down, or were they required to be or were they worked by machinery?

A. Yes; there were drops like those. In my time they were worked up and down with a block and fall.

X Q. 31. Did you see them when completed?

A. No, sir; I did not see them completed.

X Q. 32. You have stated that you saw the part of the apparatus called the dome, similar to the part marked A in the Exhibit C, being worked up and down in the part of said apparatus similar to the part marked B in the model at the Novelty Iron Works. Was not that done by the employés of the works, in putting the parts together?

A. Well, it was done in the employment of the Novelty Works to see if it worked up and down easily. It was done when we were putting the parts together to see if it would.

X Q. 33. Do you know if the part of what you call the dome, similar to the part marked A in the model, was worked all the way up and down, while you were there?

A. It was worked just a certain distance; they could put it any distance they were of a mind to, I believe.

(Last part of answer objected to by counsel for defendant as not responsive, and as stating merely the opinion of the witness.)

X Q. 34. Can you swear that you saw it yourself work all the way up and down?

A. No, sir; not all the way up and down.

RICHARD STEPHENS.

Subscribed and sworn to before me this 11th day of December, 1872.

JOSEPH GUTMAN, JR.,
Examiner, &c.

60 LYMAN G. HALL, a witness of lawful age, produced on the part of the complainants, having been by me first duly cautioned and sworn to testify the truth, the whole truth, and nothing but the truth, in the matter of controversy herein, and being examined by Mr. How, counsel for complainants, deposes and says as follows:

Q. 1. What is your name, age, residence, and occupation?

A. My name is Lyman E. Hall; I am forty-three years old; I reside at No. 156 South Eighth street, Brooklyn, E. D.; I am an engineer.

Q. 2. Where were you employed during the year 1869; in what capacity, and in what business?

A. I was employed at the Novelty Iron Works, at the foot of Thirteenth street, East River; I had charge of all the erecting and machinery department.

Q. 3. Were you at any time, in the year 1869, engaged or employed in the construction of any apparatus, or part of apparatus, for submarine operations; and, if so, what apparatus or parts, and who ordered the construction of the same, if you know?

(Objected to as immaterial and incompetent, unless connected with and shown to be the apparatus concerning which suit is brought.)

A. The apparatus that was built there—the dome part and the part they called the telescope—was built in the boiler-shop. The castings—the parts which were fastened on the inside of the dome—were fitted up under my supervision. The cranes—there were four cranes or connections with the work—all of the iron-work—were fitted up under my supervision. There was other work in connection with that. It all went on at the same time. There were four sets of engines built to hoist the dome—these I had the supervision of building. After these were all built I had them erected on the scow. The modus operandi of our work there was: we had a superintendent of the drawing-room; the superintendent had his place made through his draughts, and the draughtsman furnished the different departments with tracings of the
61 drawings that were made in the drawing-room, and the different departments executed the work, and derived all information from the superintending draughtsman. Further than that, the orders came right from the officers of the works. I might say that one of the principal officers at the time was W. P. Trowbridge, vice-president of the works. I was engaged in the construction of such apparatus.

(Objected to as to all but the last sentence as not responsive to the question, and also to so much of the answer of the witness as describes the machinery or parts thereof not constructed by him or supervised as to construction by him.)

The inside of the dome I had men putting up a chain in, on the lower circle of the dome; that chain connected with stediments on the inside of the circle, and I have had the seeing that the general work of the engines, and general work connected with the dome, was in working order.

(Objected to on the same grounds as above.)

Q. 11. Please describe the apparatus on which you were engaged, as you have testified, and parts of which were constructed under your supervision.

(Objected to on same grounds as to preceding question.)

A. I could not answer the question as you put it, because there was nothing made under my supervision.

Q. 5. Please describe the apparatus on which you were engaged, as you have testified.

(Same objection.)

A. It was a wrought-iron dome, similar in form to this (indicating Exhibit C, and pointing to the part marked "B.") It also had nine, I think, stediments similar, but not just exactly like the ones on the model, Exhibit C. It also had four eyes on the outside circle of the dome for hoisting and lowering. It also had a piece in the centre—
62 a cylinder in the centre. It also had a number of wrought-iron stediments in the bottom. It also had nine tubes running down the inside of the dome. The castings that I had fitted up were placed on the inside of the dome in the boiler-shop. All that wrought-iron work inside, when at the Novelty Iron Works, was constructed by the men employed in the boiler-shop. It would be impossible for me to give an outline of it, that is, of the inside works, under oath, as we left it unfinished.

(So much of the answer objected to as states the witness's opinion of what the parts described were intended or used for.)

Q. 6. Please look at the model now shown you, marked "Complainants' Exhibit C," and state how the apparatus constructed at the Novelty Works, as you have testified, as far as the same was finished, corresponded with or differed from Exhibit C.

(Objected to on same grounds as the objection to question 5 to the witness Richard S. Stephens, except so far as that objection relates to the testimony of Stephens, and also on the ground that the witness has testified that said apparatus was not finished at the works.)

A. In the first place, the screw represented in the model was not constructed there at all. I will mention on the model of the dome now the similar points which I remember were on at the time we left the work. These nine stediments here on the outside of the dome are similar to the ones on the dome built at the Novelty Iron Works, but not in the same position. These four eyes on the outside of the dome are similar to the ones on the dome. These stediments on the inside of the bottom part of the dome, I would take it that they represented those put on the dome at the time. This top piece marked "A" is similar, so far as the cylinder part of it is concerned, and my impression is that there were four racks on this cylinder, although I had nothing to do with it; that is, I had nothing to do with fitting that part on. This centre

63 tube, with its attachment running through the cylinder, I have no recollection of seeing. There was a galley or platform carried around on the inside of the dome. All the entire work on the inside of the dome, with the exception of the castings I have mentioned here before, and also chains connecting to the stediments, I had nothing to do with. What I mean by that is that my supervision of the work was outside of that. It differed in that these castings that I speak of were guides for these stediments. It would be impossible for me to give you the form or shape of those castings. All the other parts of the work on the inside here I am unable to make any comparison of, for really that is lost to my mind, without I had a drawing to refresh my memory. This transverse piece on the bottom of the inside of the dome I do not remember anything about. There were two oblong slots cut into the dome that we built for those chains I spoke of to pass through from the inside to the outside. There are pieces on this model here that I could not, under oath, swear were in that position, and I could not swear which position they were in.

(As much of the answer objected to as states his opinion of what was represented by certain parts of the apparatus put on the dome, and also his impression that certain parts were on the cylinder.)

Q. 7. Did you ever see the telescope on part A raised up or down in the dome or part B in the apparatus at the Novelty Works?

A. I saw them fitting it, by the boiler-makers; it was necessary to work it in the hole, to make it free—for no other purpose—for fitting it, lowering it down away, and hoisting it up. This (touching the part A) was lifted by cranes. The telescope, I might start, by saying the part A was worked up and down by one large crane on the dock; it was hoisted in by one large crane on the dock and worked up and down by that in fitting it.

(Objected to as not responsive to the interrogatory, except the first sentence, and also as to the statements of the witness of the purpose of the working of the part A.)

64 Q. 8. Was the defendant, General Newton, present at any time during the working of the telescope up and down, as you have stated?

(Objected to on the ground that General Newton has not been shown to be in any manner connected with the apparatus described, or with any apparatus.)

A. Well I could not tell really whether the general was present or not.

Q. 9. What was the object of working the telescope up and down in the dome, as you stated?

(Objected to as calling for the opinion of the witness, and also his opinion on facts not shown to exist.)

A. The idea was to see that it would pass up and down.

Q. 10. What devices, if any, were there for holding the said telescope in different positions or elevations in the said dome?

A. My impression is that there were four cast-iron racks fastened on the outside of the telescope, and there were pawls to work into that rack; I am unable to say whether they were outside or inside.

(Answer objected to as stating the impression of the witness.)

Examination adjourned to December 16, 1873, at 11 a. m.

JOSEPH GUTMAN, JR.,
Examiner.

65 NEW YORK, *Dec.* 16, 1872—11 a. m.

Examination further adjourned to December 18, 1872, at 11 a. m.

JOSEPH GUTMAN, JR.,
Examiner.

NEW YORK, *Dec.* 18, 1872—11 a. m.

Examination further adjourned to January 3, 1873, at 11 a. m.

JOSEPH GUTMAN, JR.,
Examiner.

NEW YORK, *January* 3, 1873—11 a. m.

Examination further adjourned to January 9, 1873, at 11 a. m.

JOSEPH GUTMAN, JR.,
Examiner.

JANUARY 9, 1873—11 a. m.

Counsel present: For the plaintiffs, George Gifford, esq., and Thos. P. How, esq.; for the defendants, Hy. E. Davies, jr., esq.

Examination adjourned by consent to Saturday, January 11th, 1873, at 11 a. m.

JOSEPH GUTMAN, JR.,
Examiner, &c.

The defendants now produce a model which they tender as evidence, showing the construction of the machine referred to in the bill of complaint in this cause, and in the several answers of the defendants, as having been used on Diamond and Coenties Reefs, in the harbor of New York and elsewhere, and it is hereby agreed and stipulated by
66 the respective parties that the same is a correct model of the said machine in all essential respects; and said model is marked "Exhibit D."

J. GUTMAN, JR.,
U. S. Examiner.

It is further admitted and stipulated that the use of said machine, as above stated, was after the issuing of the patent on which this suit was brought, that is, the 28th of July, 1868, and prior to the commencement of this suit.

H. E. DAVIES,
Of Counsel for Def'ts.
THOS. P. HOW,
Counsel for Compl'ts.

JANUARY 9TH, 1873.

NEW YORK, *January* 11, 1873—11 a. m.

Present: Mr. Gifford and Mr. How, counsel for complainants, and Geo. H. E. Davies, counsel for defendants.

EDWARD S. RENWICK, a witness of lawful age, produced on the part of the complainants, having been by me first duly cautioned and sworn to testify the truth, the whole truth, and nothing but the truth in the matter of controversy herein, and being examined by Mr. Gifford, deposes and says as follows:

Q. 1. What is your name, age, residence, and occupation?

A. My name is Edward S. Renwick; I am fifty years of age; I reside at Milburn, N. J., my place of business being the city of New York; I am occupied principally as expert in the trial of patent causes in the United States courts, and in soliciting patents for inventions.

Q. 2. Have you read, and do you understand, the contents of the letters-patent issued to William H. Cameyer, dated the 28th day of
67 July, 1868, for an improved portable and adjustable still-water dam, and have you examined the model marked "Exhibit D" in this case?

A. I have read the letters-patent referred to in the question, and believe that I understand the contents thereof. I have also examined the model marked "Exhibit D" in this case.

Q. 3. State whether or not you find represented in that model the invention described in said patent, and referred to in the first claim thereof, and give your reasons for any statement you may make in that regard.

A. I find in said model substantially the same improvement as is described in the patent and referred to the first claim thereof. My reasons for this opinion are as follows: The improvement recited in the said first claim, as I understand the said letters-patent, consists of the construction and arrangement of a portable and adjustable dam, in sliding or telescopic sections, in the manner described in the patent. Now, I find that said model, Exhibit D, contains, among other things, substantially the same construction and arrangement as I have above mentioned. The portions of said model to which I refer, *is* the telescope dam, composed of two sections, the lower of which is bell-formed, and constructed to receive the upper section within it, and the upper section of which is cylindrical, and is constructed and arranged to be moved into or out of the lower section, so that the two sections when the dam is closed occupy practically no more depth than the depth of a single section; and when the dam is open to its full extent it protects the interior from the exterior currents of water for a depth equal to the distance occupied by the two sections. In forming the above opinion, I have taken into consideration the fact that the form of the dam represented in the drawings of the patent is somewhat in the shape of a boat, the breadth being less than the length, and the ends being pointed, or, more properly speaking, wedge-form, whereas the dam forming part of model, Exhibit D, has circular sections, and the lower section is ball-formed, being of much larger area at its lower edge than it is at its upper;
68 but I do not regard this difference in form as constituting a substantial difference between the construction and arrangement of the portable and adjustable dam in telescopic sections constituting a part of said model, Exhibit D, and the construction and arrangement recited in the first claim of the said patent, because the said difference in form does not affect the fact that the dam, constituting a portion of said Exhibit D, is composed of sections, or that one of said sections is

arranged to slide into or out of the other, substantially as described by the patent.

Q. 4. State whether or not you find represented in said model the invention described in said patent, and referred to by the second claim thereof, and give reasons for your answer.

A. I do; my reasons being that, as I understand the said patent, the improvement recited on the second claim thereof consists of the combination of what are called in the patent the self-anchors, with the dam, in the manner described in the patent.

In the model, Exhibit D, I find substantially the same combination; the dam in said model being the portion or portions of the model to which I have referred in my last preceding answer, which dam in said model corresponds substantially with the dam described in the said patent. The self-anchors in said model are the rectangular pointed bars, which are connected with the inner periphery of the lower end of the said dam, and are constructed to slide in guides, substantially in the same manner as the self-anchors denoted in the said patent by the figure 3 are constructed to slide in guides called, in said patent, sockets, which prevent the said self-anchors from moving laterally relatively to the bottom of the dam, but permit the said self-anchors to slide downward to adapt themselves to the inequalities of the surface of the bottom to which the dam is applied.

Q. 5. State whether or not you find in said model the invention described in said patent, and referred to by the third claim thereof, and give your reasons for your answer.

69 A. I do find, substantially, the same combination and arrangement of instrumentalities as is recited in the third claim of the patent. My reasons for this opinion are as follows: The instrumentalities that are recited in the said claim, as parts of the combination and arrangement, are, as I understand the said patent, the boats, supports, or floats, the dam and the anchors which hold the boats, supports, or floats in their positions. The dam in said combination is combined with the boats, supports, or floats in such manner that it may be lowered or raised from the said boats, and the anchors are so arranged that the boats and the dam, when connected with the boats, are held in position, both longitudinally and laterally. In the said model, Exhibit D, the scow with its deck is the equivalent of the boats and deck described in the said patent, and referred to in the claim by the words, "boats, supports, or floats." The dam in said model, corresponding with the dam referred to in the said claim, is the portion thereof referred to by me in my answer to the third interrogatory. The anchors in said model, corresponding with the anchors referred to in the said claim, are the anchors which are now upon each end of the deck of the scow, and by means of which the said scow and the dam, when in connection with it, are prevented from moving, both longitudinally and laterally. In forming this opinion I have taken into consideration the fact that in the drawings of the patent only four anchors are represented, whereas six are contained in the said model, Exhibit D; but I do not regard this difference as material, because the six anchors are arranged to secure the scow, both longitudinally and laterally, as described in the patent, and the increase in the number of the anchors does not change in substance their combination and arrangement relatively to the scow and the dam. I have also taken into consideration the fact that in the drawing and description of the patent two boats or floats (one at each side of the dam) are represented and described; the two being connected by a deck having a central opening, in order to permit the dam

to be operated, whereas in the model, Exhibit D, a single scow, with a central opening, is used to support the deck and the dam when
70 suspended from the said deck. I do not regard this difference as material, because a scow, of the form existing in said model, with a central opening, is a well-known structure frequently used as an equivalent for two boats for the purpose of supporting and floating a load.

Q. 6. State whether or not you find represented in said model the invention described in said patent, and referred to in the fourth claim thereof. Please accompany your answer with the reasons therefor.

A. I find in said model substantially the same combination and arrangement as is recited in the fourth claim of the said patent. My reasons for this opinion are as follows: The instrumentalities which are recited in the said fourth claim, as I understand the said patent, are the windlasses upon which the chains are coiled, and by which the dam is lowered or raised; the chains which connect the dam with the said windlasses, the boats or float to which the windlasses are secured; the dam and the drill-tubes connected with the said dam for the purpose of guiding the drills in their movement; the said instrumentalities are so arranged and combined that the dam may be lowered from the boats by the operation of the windlasses and chains, and that the drill-tubes are held in their proper positions by the dam, so that a series of drills may be operated within and enclosed by the dam. The said model, Exhibit D, contains instrumentalities corresponding substantially with all of those I have above enumerated, and combined and arranged relatively to each other substantially in the same manner. The windlasses in said model are the four windlasses in the body of the scow upon which the chains are coiled, by which the dam is lowered or raised. The chains in said model are the chains which connect the dam with the said windlosses. The scow, with its deck, in said model is the equivalent of the boats recited in the said claim, and, like said boats or floats, holds the windlasses and the weight of the dam, when it is suspended from the boats, or in the model the scow, through the intervention of the chains and windlasses. The dam in said model is the portion to which I have referred in my preceding answers by that name. The drill-tubes in said model are the tubes which are connected with the said
71 dam, and in said model are arranged in two-ring series, such tubes being in positions to guide the drills, so that a series of drills may be operated within and be enclosed by the dam, substantially as described in the said patent. In forming the said opinion, I have taken into consideration the fact that in the drawings of the patent the windlasses are placed upon the deck of the boats or float, and the chains extend directly from the barrels of the windlasses to the lower part of the dam, whereas in the model, Exhibit D, the windlasses are placed in the body of the scow, and the chains, on their way to the lower part of the dam, are caused to pass over cranes; but I do not regard this difference as material, because the position of the windlasses upon the scow does not effect the fact that they wind up or slack the chains for the purpose of raising or lowering the dam, and because in both cases the strains upon the windlasses *is* propagated to and sustained by the floats or scow, and therefore the placing of the windlasses in one portion or another is not a substantial difference in the combination, although, as a matter of convenience, the positions in which the windlasses are placed on the model, Exhibit D, is preferrable to those in which they are represented in the drawings of the patent. The use of the cranes in the said exhibit also does not change the combination and arrangement substantially, because such use does not change the fact that the chains

which are connected with the dam are combined with the windlasses for the purpose of lowering and raising the dam, and that the weight of the dam when raised is transferred through the chains to the scow, which is the equivalent of the boats, for the purpose of floating or supporting the dam. I have also taken into consideration the fact that the description and drawings of the patent describe and represent two boats having a deck connecting them, whereas in said model D there is a single scow supporting the deck; but I do not regard this difference as material, for the reasons given in a preceding answer in reference to the same instrumentalities.

Q. 7. Look at model, complainants' exhibit E, and state what it represents.

72 A. Upon examining the said mode, complainants' exhibit E, I find that it is a substantial representation of the structure represented and described in the patent, complainants' exhibit A, in all the particulars recited in the claims, with the exception of the windlasses, which are represented in the drawing of the patent, but no representations of which are found in the model, complainants' exhibit E.

And being cross-examined by counsel for defendants, he says:

X Q. 8. Have you ever seen the machine described by the model, Exhibit D, in operation?

A. I have not, except the view that I have had of a machine at Hell Gate, when passing it on a steamboat, which view was so transitory, and at such a distance, that I do not think it afforded me any material information on the subject.

X Q. 9. You cannot, then, speak of your own personal knowledge of the manner in which this machine is worked or operated, except from the inspection you have had of the model?

A. I cannot, except from the examination of the model.

X Q. 10. Have you ever seen this model adjusted as the machine is adjusted for working?

A. I have not, in all respects, as I have never seen the model adjusted with the bridges down, or with the anchors carried to a distance from it, or with the drilling-machines in the positions they occupy when at work.

X Q. 11. Have you ever seen a machine described in the letters-patent of the complainants, or resembling the model here presented, Exhibit E, in actual use or operation?

A. I have not, with the exception of the transitory view I have before mentioned of the structure represented by Exhibit D.

X Q. 12. Do you know, of your own knowledge or from information derived from the complainants, whether any machine has been constructed by them and practically used, made according to their letters-patent, and upon the plan presented by Exhibit E?

73 A. I do not, either from my own knowledge or from information derived from complainants.

X Q. 13. The dam or dome, represented in Exhibit D, differs materially in shape and construction, does it not, from that described in the complainants' letters-patent?

A. The dam or dome of complainants' exhibit D differs in shape from the lower section of the dam represented in the drawings of the patent, but not materially, because such differences in shape does not change its mode of operation as a dam, or the lowest section of a dam, composed of telescopic sections. The dam or dome of said Exhibit D also differs in some of the minor details of its construction from the corresponding lower

section of the dome represented and described in the patent, but these differences, in my opinion, are not material as respects the fact that the said dome forms the lowest section of a portable and adjustable dam constructed of sliding or telescopic sections.

(All part of answer after word "materially" objected to as not responsive.)

X Q. 14. Has the dome represented in Exhibit D any section resembling in shape one or more of the sections represented in the letters-patent?

A. The dome itself is a section or part of the dam, but it does not resemble in shape any one of the sections or parts of the dam represented in the letters-patent, except in the respect that its top and bottom rings are parallel with each other.

X Q. 15. Is not the dam represented in the complainants' letters-patent raised and lowered by chains attached to its bottom?

A. It is raised and lowered by chains attached to its lowermost section, but not to the bottom of that section, as the parts to which the chains are attached are about midway between the upper and lower rims of that section.

X Q. 16. Does not the dam represented in the plaintiffs' letters-patent lengthen or shorten in depth by the operation of raising or lowering it?

74 A. If constructed exactly as represented in the drawing in the patent it will lengthen or shorten as *as* it is lowered or raised.

X Q. 17. Is there any arrangement or provision for such lengthening or shortening by the operation of raising or lowering in the machine described in Exhibit D?

A. There is in Exhibit D a provision which can be so employed that the dam will lengthen or shorten as it is lowered or raised.

X Q. 18. Do you not observe on Exhibit D windlasses and chains arranged specially to raise or lower the portion which you have called the upper or telescopic section?

A. I do observe in Exhibit D windlasses and chains which may be used to raise and lower the upper telescopic section.

X Q. 19. Do you not also observe in Exhibit D ratchets and pawls arranged to hold the part you have called the upper telescopic section in any desired position?

A. I have observed such ratchets and pawls.

X Q. 20. If the lower portion of the dam is lowered, the ratchets and pawls being fixed, will that operation increase the length or height of the dam from top to bottom?

A. Of course, if the ratchets and pawls are fixed so as to prevent the relative movement of the two sections, the lowering of the bottom portion will not increase the length of the dam from top to bottom, as the two sections, being fastened to each other, for the time being would move together.

X Q. 21. If the machine were standing, as it now is, would the operation of the engines and windlasses designed to raise or lower it increase or diminish its present height?

A. Whether it will or will not will depend upon circumstances which are not mentioned in the question. If, for example, the hooks of the chains and windlasses, which hooks now hang a little above the upper telescopic section, are connected with the eyes of that section, and the ratchets and pawls be disengaged so as to permit the movement of the two sections relating to each other, the lowering of the lowermost sec-

75 tion by the windlasses and chains applied to it will effect the

lengthening of the dam. If, on the other hand, the pawls engage in the rack, so as to prevent the relative movement of the two sections and the windlasses, and chains which appertain to the outer ends of the cranes are not used, the lowering of the lowermost section will not effect the lengthening of the dam, as the two sections, being secured to each other, would move simultaneously.

X Q. 22. This dome or dam, represented in the complainants' Exhibit D, is not self-adjusting as to the length or depth, but its height or depth must be adjusted by machinery separate and distinct from that used in raising and lowering it?

A. It is either self-adjusting or not self-adjusting, according to the manner in which it is used. And its height or depth may be adjusted by machinery if desired.

(Objected to by counsel for defendant as irresponsive.)

X Q. 23. If the dome or dam were disconnected from the upper set of windlasses and chains designed to be attached to its upper section, would the operation of raising or lowering it increase or diminish its height or depth?

A. It would not, unless something were substituted in place of such windlasses and chains.

X Q. 24. If the upper telescopic section, as you term it, were removed, would the dome or dam, as it then would be, be in your opinion an infringement of the first claim of the complainants' letters-patent?

A. It would not in that event be an infringement of the first claim, in my opinion.

X Q. 25. For what are the parts designated in the complainants' letters-patent as self-anchors intended?

A. They are intended for the purposes of engaging in inequalities of the surface to which the dam is applied, of adapting themselves to the greater or less distances from the lower edge of the dam, of the places on which their points engage, and of preventing the lateral movement of the dam by the action of external currents.

76 X Q. 26. Do they furnish any perpendicular support to the weight of the dam?

A. If constructed without any additional appurtenances than those represented and described in the patent, they do not furnish any perpendicular support to the weight of the dam?

X Q. 27. Have not supports of that description, moving freely up and down so as to adjust themselves to inequalities at the bottom of a river, been commonly and for a long time used to maintain vessels or other floating objects in one position?

(Objected to, as there is no prior invention, or use, or knowledge of the patented invention, or any part thereof, set up in the answer, or at issue in this suit.)

A. I have known similar instrumentalities, arranged to slide in guides, used in connection with vessels to maintain them in one position.

X Q. 28. Is there any difference or particular feature in the boat or floats described in the plaintiffs' patent differing from boats or floats already in use for moving machinery upon the water?

(Same objection as before.)

A. The boats or floats described in the complainants' patent, considered separately from their combination with the dam, do not differ materially from boats or floats which I have long known for other purposes.

X Q. 29. What difference, if any, is there in the method adopted by the defendants in the moving arrangements of the scow, represented by

Exhibit D, from the ordinary method adopted for securely fastening any vessel in a rapid and shifting tide-way?

(Objected to for the reasons above stated.)

A. The moving appurtenances employed by the defendants in Exhibit D do not differ materially from moving appurtenances which I have known for the purpose of moving vessels.

77 X Q. 30. Are not the anchors, described by the plaintiffs in their letters-patent as used for moving their floats, attached also to the lower section of their dam?

A. In the drawings of the patent they are represented as being connected simultaneously with the boats and with the lower section of the dam, and the descriptive part of the patent describes this connection, but the patent also describes the connection of one or more anchors directly and exclusively to the guard of the boat.

X Q. 31. Do not the letters-patent of the complainants contemplate the use of anchors attached to the lower section of the dam, and thence to the deck of the float, as a means of ensuring its stability?

A. The letters-patent of the complainants describes, among other things, anchors whose chains pass through eyes connected with the lower section of the dam and thence to the boats above, and, no doubt, contemplates such use of anchors when circumstances require it.

X Q. 32. Is there any provision in Exhibit D for securing the bottom of the dome or dam by means of anchors attached as described in the complainants' letters-patent, or otherwise?

A. There is a provision on Exhibit D which may be used for that purpose, such provision being the large eyes or rings which are secured to the exterior of the lower section, near its lower end, but there are no anchors shown in said exhibit as connected with the said rings; of course I do not refer to the self-anchors.

X Q. 33. Do you see in Exhibit D any chains or windlasses that are designed for use for the purpose enquired of in the last question?

A. I do not see either chains or windlasses which appear to have been designed for that purpose.

X Q. 34. Is there any peculiarity of shape or construction in the windlasses and chains on board of the machine represented by Exhibit D, used in raising and lowering the dome, differing from ordinary machinery used for hoisting purposes?

(Objected to on same grounds as before.)

78 A. The chains and windlasses that are used for raising and lowering the dome or lower section in Exhibit D do not differ materially from windlasses and chains which I have known to be used for moving heavy articles.

X Q. 35. Could not the dam, or dome, represented in Exhibit D be raised and lowered by any vessel containing a floating derrick of sufficient power to sustain the weight, as by the machinery represented in Exhibit D used for that purpose?

A. The dam or dome could be raised or lowered by a floating derrick.

X Q. 36. The drill-tubes represented in the complainants' letters-patent, are rigidly fixed in the lowest section of the dam, and are made to play up and down through a support on the float or support, are they not?

A. The drill-tubes represented in the drawings of the patent are rigidly connected with the lowermost section of the dam, and their upper ends pass through holes in a bar which is connected with the boats above, so that the tubes slide up and down through the holes in the said bar as the dam is raised or lowered.

X Q. 37. Do you see in Exhibit D any arrangement of drill-tubes similar to this described in the complainants' letters-patent?

A. I do.

X Q. 38. Please describe it.

A. There is a series of drill-tubes connected with the lower section or dome, and the combination and arrangement of these drill-tubes with that section is substantially the same as the combination and arrangement of the drill-tubes described in the patent with the corresponding section of the dam; the drill-tubes, in both cases, being combined with the lower section so as to be held in position by it, and the drill-tubes in both cases being arranged within the section so that the series of drills can be operated within the dam.

X Q. 39. Is there any freedom of movement or play to any one of those drill-tubes, as represented in Exhibit D?

79 A. Relatively to the lower section of the dam there is not; relatively to the boat there is, because as the dam is raised or lowered the drill-tubes move relatively to the boat.

(All after the word "boat" objected to as not called for by the question.)

X Q. 40. Is not the dam represented and claimed in the plaintiffs' letters-patent intended to increase or diminish in height, as the boat to which it is attached rises or falls with the tide, without the aid of any machinery or appliances for that purpose?

A. There is nothing said on this subject in the patent, that I am aware of, but if the apparatus is constructed in all respects as represented in the drawings of the patent, the dam will increase and diminish in height by the movement of the boats or floats, as the tide rises and falls.

X Q. 41. Is it not necessary, for the successful operation of the machine described in complainants' letters-patent, that it should be connected with the combination of boats, supports, or floats and anchors, while in operation?

A. If the machine is constructed in all respects in accordance with the patent, and without any addition, it is necessary, for its successful operation in water so deep as to require the use of more than one section, that the dam should be connected with the boats or their equivalent, and with anchors, by which such boats or their equivalent are maintained in their proper position.

X Q. 42. According to the letters-patent of the complainants and the model exhibited, Exhibit E, is not the upper part of this dam rigidly and permanently attached to the boat or floats by which it is supported?

A. The upper part of the dam, as described in complainant's patent, is suspended from the deck by links and bolts. These are not permanent attachments, as they may be readily removed so as to free the upper portion of the dam from the boats. The said mode of attachment is rigid so long as the weight of the upper portion of the dam hangs suspended upon it, and there is no tendency to move the

80 boats or upper sections laterally to each other; but the said attachment admits of a slight lateral movement.

X Q. 43. Is it not essential to the working of the machine described in the complainants' patent, that while in operation the dam should be suspended from a boat or float?

A. If the machine is constructed, as described in the patent, without any additions, the lowermost section, and possibly others, (depending upon the depth of the water and the number of sections,) are not suspended from the boats or float when the apparatus is in use, but the

uppermost section, and possibly others, (depending upon the number of sections of which the dam is composed,) is suspended from the boats or float while the dam is in use.

X Q. 44. Could this machine be worked in water of the depth of twenty feet, were the upper section entirely disconnected from the supports or floats which are intended to support the dam?

A. Whether it could or could not would depend upon circumstances which are not mentioned in the question. If, for example, additions are made to the apparatus by *by* means of which the sections may, when desired, be, for the time being, fastened together, the machine could be worked in water of the depth of twenty feet, when the upper section was entirely detached from the supports or floats. If, on the other hand, no such additions were made, and the uppermost sections were connected with the boat, in the manner represented in the drawings of the patent, the machine could not be practically used if that connection were broken.

Examination adjourned to January 17, 1873, at 11 a. m.

JOSEPH GUTMAN, JR.,
Examiner.

81 N. Y., *January* 17, 1873—11 a. m.

Cross-examination of the witness Renwick resumed by counsel for defendants:

X Q. 45. Is not the form or shape of the dam described in the complainants' letters-patent an element of their patent and of their claim?

A. If the word form be considered broad enough to include the fact that the dam must be an enclosure open at top and bottom, then to that extent form is an element, but the peculiar form of cross-section or vertical section of the dam is not material or an element of any one of the claims.

X Q. 46. Do you not find on the second page of the patent, in second paragraph, an allusion to the form described in fig. 4 of the plates of which the sections of the dam are composed, and a reason there given for adopting that form?

A. I do.

X Q. 47. In using and operating the machine described in the complainants' letter'-patent, is it intended that the lower section of the dam there described, or any other portion of that section, shall rest upon the rock intended to be worked upon by the machine?

A. It is impossible to tell from the patent all the intentions which the inventor may have had of the use of his contrivance; but if the description of the operation of the apparatus given in the paragraph on that subject be followed out strictly, the lower section of the dam, when lowered to its work, would rest upon the bottom of the channel, unless it be held therefrom by the apparatus employed to raise and lower it. In the drawings of the patent the lower section of the dam is shown as held from resting on the bottom by the windlasses and chains used for raising and lowering it, so that there appears to have been an intention to use the apparatus in two different ways, judging from the information given on this subject by the specification and drawings.

X Q. 48. Is the use of tubes fixed on a platform or support as guides for drills used in submarine drilling common and frequent, and were they not so used before the date of the plaintiffs' patent?

82 (Objected to so far as it tends to prove priority of invention, because such a defence is not set up in the answer.)

A. I do not know that such use was common or frequent before the date of the plaintiffs' patent. I recollect having heard of the use of guide-tubes for drills, such guide-tubes being connected with a platform above the surface of the water, at a date earlier than the date of the plaintiffs' patent, but do not recollect where such use was said to have been made.

X Q. 49. For the purpose of submarine drilling is it not necessary that the guides or tubes through which the drills work should be firmly and rigidly fixed through the whole operation of drilling each separate hole?

A. The guide-tubes should be held rigidly in their place by some means which, after the drill has entered sufficiently, may be the drill itself at the lower end, some other mechanism being used at the upper end of the tube.

X Q. 50. Would it be possible to drill successfully if the drill were operated through a tube that shifted its position laterally at any time during the process of drilling?

A. Certainly not.

E. S. RENWICK.

Subscribed and sworn to before me this 17th day of January, 1873.

JOSEPH GUTMAN, JR.,
Examiner, &c.

THOMAS W. CONKLIN, a witness of lawful age, produced on the part of the complainants, having been by me first duly cautioned and sworn to testify the truth, the whole truth, and nothing but the truth, on the matter of controversy herein, and being examined by Mr. Gifford, counsel for complainants, deposes and says as follows:

Q. 1. What is your name, age, residence, and occupation?

83 A. My name is Thomas W. Conklin. I am fifty-one years old. I reside at Belport, Long Island, N. Y. I am a submarine diver.

Q. 2. Have you been employed at any time as a diver at Diamond and Coenties Reef, East River, in reference to blasting rocks under water?

A. Yes; in the summer of 1871.

Q. 3. How long were you so employed?

A. From the first of May until about the middle of December, 1871.

Q. 4. Explain what was the nature or kind of the work which you did there?

A. I was in the night-gang; there were two gangs of workmen, one gang for the day and one for the night. It was my duty to survey the bottom to locate the dome when necessary; when the dome was down and they were to work at the drilling, it was my duty to loosen the drills that might be fast, or any other work that the captain called on me to do; to plug the holes after they were of sufficient depth. I was also employed a portion of the time, in the day-time, to put in the glycerine charges.

Q. 5. You have spoken of a dome and its being located. How was it located.

A. On the bottom, where the rock was sufficient to drill.

Q. 6. Did anything hold it after being located, to prevent it from being carried away by the tide?

A. No, sir; the chains that lowered it down were detached from it.

Q. 7. What prevented it from being carried away by the tide, if anything; I mean the dome?

A. It had spuds, as we always called them, on the bottom.

Q. 8. What did those spuds do?

A. After the dome was lowered those spuds were tripped, and it stood upon them as legs.

Q. 9. Describe one of those things you call a "spud."

A. They were of iron, if I remember right, about five inches square and some five feet long, and worked into guides up and down.

84 Q. 10. If the rock was uneven, being higher in some places than in others, how would these spuds adjust themselves upon the rock, if at all?

A. After they were tripped from the rest that held them up, they would go down and strike the rock if inside of their length.

Q. 11. Was that dome open or closed at the top?

A. It was open at the top.

Q. 12. How was it managed when the water was deeper than the height of the dome to prevent the water running in at the top, or to prevent the current passing over the open top?

A. When the dome was down, the tide would sometimes ride over it and fall below the top.

Q. 13. State whether or not there was any part which slid in and out of the opening in the top of the dome.

A. There was a top that was called the tele'cope.

Q. 14. How was that used?

A. To slide up and down.

Q. 15. When was it slid up and down? Explain what would render such sliding necessary, if anything.

A. About the middle of May I was on board, in the day-time, and saw them lower it; the time I speak of it was too high; the tide was down and the bridges that supported the engines were too near to work the drills.

Q. 16. What was too high?

A. The top of the telescope.

And being cross-examined by General Davies, counsel for defendants, he says:

X Q. 17. Were not these things you call spuds used to level this dam and keep it even?

A. Yes, sir; they were to equalise the bottom by the different lengths.

X Q. 18. So that the dome should be level, and the drill-tubes perpendicular?

A. Yes, sir.

X Q. 19. Was there not on each of these spuds, as you call them, a cam that prevented the spud from working upwards?

A. Yes, sir.

85 X Q. 20. It would not move freely up and down its guides, then, when the dam was lowered, unless the cam were tripped?

A. No, sir; the cam would hold its own weight, or the weight of the dome.

X Q. 21. When the dam was lowered, and these spuds were let go to the bottom, the dome stood upon these spuds, as a table does upon its legs, did it not?

A. Yes, sir; it stood upon the twelve legs.

X Q. 22. Part of your duties, you said, Mr. Conklin, were to locate the dome, was it not?

A. Yes.

X Q. 23. Were you ever instructed, or was it your habit, when locating the dome, to look for crevices in the rock in which these spuds could be fitted?

A. No, sir.

X Q. 24. When the dome was once lowered and in position, could these spuds be moved or altered without raising the whole dome from the bottom?

A. I never saw them moved after they were once tripped, without raising the whole dome out of the water.

X Q. 25. You saw this part of the dome you call the telescope lowered once, Mr. Conklin?

A. Yes, sir.

X Q. 26. Did you ever see it lowered more than once?

A. Not to my recollection.

X Q. 27. What position was the dome in when this lowering was done?

A. It was hoisted up in the chains.

X Q. 28. The boat was lying where at that time?

A. At Diamond Reef, in the East River.

X Q. 29. You never saw the telescope raised after that, did you?

A. Not to my recollection, until they took it out after she was laid up. They took it to pieces after she was laid up.

X Q. 30. When you say this lowering of the telescope took place, the dome was hanging in the chains. You swear that it was not in operation, and not in position for working, don't you?

86 A. It was hanging in the chains, not working; not in the position to be at work.

And being further examined by Mr. How, counsel for complainants, he says:

R. D. Q. 31. When the spuds, as you call them, were tripped, as you have stated, what caused them to descend so as to reach the rock, as you have stated; what carried them down?

A. On the inside of the dome there was a rim that supported the weights while up; it was so arranged that that rim could be revolved and the spuds all tripped at the one time.

R. D. Q. 32. But when these spuds were tripped what caused them to descend?

A. Their own weight.

R. D. Q. 33. What regulated the distance that each spud descended?

A. The bottom; they fetched up on the bottom. If there was no greater difference in the bottom than about five feet, they would all take. If there was a greater difference than the length of the spud, they would not touch the bottom.

R. D. Q. 34. What was the shape of the lower ends of these spuds?

A. They were squared off to a point.

R. D. Q. 35. What purpose did the sharpening of the lower ends of these spuds serve?

A. To keep them from slipping on the rock.

R. D. Q. 36. What purpose did the raising of the telescope, as you call it, up and down in the dome serve?

(Objected to on the ground that no cross-examination of the witness had been had on that subject, and therefore it should have been asked on the direct examination, and also on the ground that the witness has not shown that he ever saw any up and down movement of the said telescope.)

A. The only purpose, when I saw it move, was that the depth of water, at low water, where we were going to place it, was not sufficient to keep the bridges from touching the top of the telescope.

87 R. D. Q. 37. Did you or not ever see the telescope adjusted in the dome, as to length, when the dome was down in working position?

A. No, sir.

And being further cross-examined by counsel for defendants, he says:

R. X Q. 38. You never saw but one motion of this thing that you call the telescope, did you?

A. I do not remember of ever seeing it move but the once.

Re-X Q. 39. And it was then so moved for the purpose of getting it out of the way of the bridges so that the drilling-machinery could be operated, was it not?

A. Yes.

Re-X Q. 40. While you were engaged upon this dome, it was used in several different places, was it not—shifted from one place to another?

A. It was used on the two reefs, Diamond and Coenties Reef, and at different positions on the reefs.

Re-X Q. 41. The depth of the water varied, did it not, in the different positions in which it was used—deeper in some and of less depth in others?

A. Yes, sir; from 16 to 24 feet. If my memory serves me right, 16 was about the shoalest, and 24 the deepest.

Re-X Q. 42. At what stage of the tide do you give those depths?

A. Low water.

Re-X Q. 43. About what is the difference in the depth between high and low water on these reefs, according to the rise and fall of the tide?

A. About six feet.

Re-X Q. 44. While you were working on the machine it was used at different stages of the tide—at all stages of the tide from high to low water?

A. It was.

Re-X Q. 45. Did you ever see any adjustment of that part you call the telescope made to suit the different stages of the tide or the different depths of the water?

A. Not after it was low enough to keep the bridges clear from it.

88 Re-X Q. 46. And this time that it was lowered to get it out of the way of the bridges was the only time you saw it moved, was it not?

A. To my recollection it was the only time.

THOS. W. CONKLIN.

Subscribed and sworn to before me this 17th day of January, 1873.

JOSEPH GUTMAN, JR.,
Examiner.

Examination adjourned to January 20th, 1873, at 11 o'clock a. m.

NEW YORK, *January* 20, 1873—11 a. m.

Present: Counsel as before, Mr. Gifford and Mr. How, for complainants; Mr. H. E. Davies, jr., for defendants.

SAMUEL LEWIS, a witness of lawful age, produced on the part of the complainants, having been by me first duly cautioned and sworn to testify the truth, the whole truth, and nothing but the truth, in the matter of controversy herein, and being examined by Mr. Gifford, counsel for complainants, he says:

Q. 1. What is your name, age, residence, and occupation?

A. My name is Samuel Lewis. I am forty-eight years old. I reside in Brooklyn, E. D., New York State. I am a manufacturer of wood matting.

Q. 2. State whether or not you had any interviews prior to the commencement of this suit with the defendant, General Newton, respecting the use of the invention described in the letters-patent on which this suit is brought; and, if yea, at what date was the first of them?

A. I had a number of interviews. The first was in the latter part of July or the first part of August, 1868.

Q. 3. State whether or not at that interview you explained your invention to him.

A. I did explain it.

89 Q. 4. State whether or not at that interview you showed him any part which is in model complainants' exhibit E; and if yea, what part?

A. I carried a photograph of the original drawings, showing a plan of the telescopic dam, also a model of the dam and the adjustable anchors, and showed them to him.

Q. 5. Have you the photographs you mentioned in your last answer; if you have, please produce them, to be marked as exhibits in this case?

A. I produce three of them, one is lost; there were four originally. (They are marked respectively complainants' exhibits F, G, and H.—J. G., Jr.) I think there never was a duplicate set of these photographs left at General Newton's office.

Q. 6. In your answer to the fourth question you say that you showed General Newton a model of the dam. Was that the same model of the dam which is now in complainants' exhibit E.

A. It is the model of the dam without the boats or attachments.

Q. 7. At what time was your last interview with General Newton respecting the use of your invention?

A. In the summer of 1869.

Q. 8. State what, if anything, General Newton, at that interview, said in reference to the use of the invention?

A. General Newton refused to adopt my machine, and gave for his reason that he did not know at what time he might be removed from the charge of the work.

Q. 8. Who was present at the first interview which you have mentioned besides yourself and General Newton?

A. Mr. Cammeyer, one of the complainants in this suit.

Q. 10. Who was present at the last interview with General Newton which you have mentioned besidés yourself and General Newton, if any one?

A. Mr. William Waterbury.

And being cross-examined by Mr. Davies, counsel for defendants, he says:

90 X Q. 11. Where was it that this first interview with General Newton that you speak of took place?

A. I think it was on Houston street, near the Army building. I think it was where his present office is. I think it was General Newton's office; General Newton was there.

X Q. 12. Was there any one else in the office at this interview besides General Newton, Mr. Cammeyer, and yourself?

A. No one else in that part of the office.

X Q. 13. Were there no other people in the office who could hear the conversation going on between you and General Newton?

A. They could not hear the conversation; there were people in the outer office; draftsmen, &c.

X Q. 14. What induced you to go to General Newton's office with this invention?

A. Having read General Newton's reports from time to time, one in particular of 1867, setting forth the difficulties of accomplishing anything in submarine drilling in strong currents, I turned my attention to inventing a machine for that purpose, and took the model to General Newton's office, to solicit his influence for its use by the Government.

X Q. 15. Did you at that time make any proposals to him to do any work for the Government with this machine?

A. I asked the general if he could not get me a contract from the Government, or would use his influence to get this machine adopted.

X Q. 16. You did not at that time make any proposals to do any work for the Government with this machine?

A. Not further than what I have stated.

X Q. 17. Did you ever at any time make proposals to do work for the Government with this machine?

A. I did.

X Q. 18. When was that?

A. September 21st, 1868.

X Q. 19. Did you make the proposals in compliance with an advertisement that was issued for bids for work by General Newton?

91 A. I made the proposals at that time, but not in compliance with the advertisement.

X Q. 20. What was the reason that you did not comply with the advertisement?

A. They made no provision for money enough to build machinery to do the work.

X Q. 21. Who did not make the provision for machinery?

A. General Newton or the Government.

X Q. 22. In your proposals you undertook to do the work you bid for with the aid of your machine and invention, did you not?

A. I did not propose any machine in particular.

X Q. 23. Has a machine ever been constructed adapted for practical use pursuant to the specification in your letters-patent?

A. Yes, sir; General Newton built one.

X Q. 24. Neither you nor Mr. Cammeyer ever built one, did you?

A. We did not, but would if we could have got the contract.

X Q. 25. Your last interview with General Newton, you say, occurred in the summer of 1869?

A. I think so.

X Q. 26. Where did that take place?

A. At the Army buildings, corner of Houston and Green streets, at General Newton's office.

X Q. 27. Was there any person besides yourself, General Newton, and Mr. Waterbury then present?

A. There were a number in the other rooms. There were several rooms, and the doors were generally standing open.

X Q. 28. You are sure there was no one in the room in which this interview took place but you three, are you?

A. There might have been persons come in to ask questions. There was no one that remained there.

X Q. 29. Who was Mr. Waterbury; what was his business and occupation?

A. Mr. Waterbury is a spar-maker by trade.

X Q. 30. What was the reason for his being present at this interview?

92 A. Well, he stated that he was well acquainted with General Newton, and that he thought he might have some influence with him in getting him to take hold of this machine, and I also believe that he had some business with General Newton with reference to the East River bridge at that time.

X Q. 31. Did you, at this time, again exhibit to General Newton the model of this machine?

A. Not in the form that it is here; an improved machine, for the same purpose.

X Q. 32. Did you have a model of that improved machine, for the same purpose that you speak of, then to exhibit to General Newton?

A. I did.

X Q. 33. And it was this latter machine that you there urged him to adopt and use, was it not?

A. Not particularly in that form, but embodying some of the principles.

X Q. 34. What were these principles that you speak of that you endeavored to get General Newton to adopt and use at this last interview of 1869?

A. The principles of several inventions that I made from the time of my first interview up to the time of my last interview.

X Q. 35. Were these inventions embodied in this machine, a model of which you presented to him at this last interview?

A. I think the dam was left off of the last model.

X Q. 36. Please describe, particularly and in detail, this machine which you presented to him at the last interview and urged him to adopt.

A. The principal part of difference between the first machine shown to General Newton and the one that I exhibited last in his office was that the dam was left off, showing the drill-tubes with machinery to operate a gang of drills; and the boat, instead of floating on the water, was raised up on supports or spuds.

X Q. 37. In the last machine, then, you abandoned the use of a dam, did you?

A. I left the dam off of the machine to show another form,

93 thinking that General Newton had a wide field of work where there was less current than in Hell Gate, and the machine might be operated under such circumstances without a dam.

X Q. 38. Was the last machine ever patented by you, or by any one on your behalf?

A. Yes, sir.

X Q. 39. At what date?

A. I don't know that I could tell without referring to the patent. I think January 5, 1869.

X Q. 40. Was there not a drawing of this machine that you have last spoken of published in some engineering paper in the fall or summer of 1869?

A. There was a wood-cut of the machine in the Scientific American and the Journal of Mining. I don't remember the date.

X Q. 41. At this last conversation with General Newton you only requested him to adopt the machine of which you have last spoken, did you not?

A. I did not speak particularly of any machine. General Newton had seen the different forms which I had brought to him.

X Q. 42. You then consider the machine which you last brought him

as only a different form of the machine which you first brought him, do you?

A. I considered it a part of a machine to do the same work.

X Q. 43. Last question repeated.

A. I cannot make any different answer.

X Q. 44. Did you consider them, then, different machines for doing the same work?

A. There is a difference in the operations of the machines, in the handling of them.

X Q. 45. Is there not a difference in their construction?

A. I have already explained the difference in a previous answer.

X Q. 46. Question repeated.

A. Well, one machine is shown without a dam, and the boat is raised above the water on supports or spuds.

X Q. 47. Question repeated, and counsel asks to have a negative or affirmative answer.

94 A. There is a difference, and that difference is that the dam is left off this machine and shows the tubes.

And, being further examined by Mr. Gifford, he says:

R. D. Q. 48. State what was the final reply of General Newton at that last interview respecting what apparatus he would use.

A. General Newton did not say what apparatus he would use. He gave me to understand that he could not do anything for me, giving the same reason that he did before, that he might be removed. I then and there asked General Newton if he would not adopt my machinery for this work, referring to Hell Gate and East River, or such work as might come under his supervision. General Newton then answered me by saying if the Government appropriated money sufficient that the Government engineers intended to do this work. I asked him then if he thought he could do it without using my machine, or some part of it. He said that if any person had a patent on any machine that he wanted to use for the use of the Government that he would use it.

And, being further cross-examined by Mr. Davies, counsel for defendants, he says:

Re-X. 49. This final reply that you have last spoken of, given at this last interview, was in reference to the machine you then and there exhibited to him?

A. It was in reference to the machinery that I had exhibited to General Newton from time to time at the different interviews.

Re-X. 50. You talked over all these machines, then, at this last interview?

A. We talked over some of them.

Re-X. 51. Specify which you talked over at this last interview.

A. I talked over this machine that I exhibited to General Newton at this last interview without the dam.

Re-X. 52. Did you not understand, in all your conversation with General Newton in reference to the business you have spoken of, that he was acting as an officer and an employee of the United States Government solely, and had no personal interest in this business whatever?

95 A. I understood that General Newton had charge of the Government work. I saw that, I think, in some order of the War Department, published in some paper in 1866 or 1867.

SAMUEL LEWIS.

Subscribed and sworn to before me this 20th day of January, 1873.
JOSEPH GUTMAN, JR.,
Examiner.

WILLIAM H. CAMMEYER, a witness of lawful age, produced on the part of the complainants, having been by me first duly cautioned and sworn to testify the truth, the whole truth, and nothing but the truth, in the matter of controversy herein, and being examined by Mr. Gifford, deposes and says as follows:

Q. 1. What is your name, age, residence, and occupation?

A. My name is William H. Cammeyer. I am fifty-one years old and upwards. I reside at Williamsburgh, N. Y. I am the proprietor of the Union Base Ball and Skating grounds.

Q. 2. Have you been present at the examination of Samuel Lewis, and are you one of the complainants in this suit?

A. I have been present, and I am one of the complainants.

Q. 3. Were you present at the time that Lewis states as his first interview with General Newton, respecting his use of his invention; and, if yea, who, if any one, was present besides General Newton, said Lewis, and yourself?

A. I was present at the time Mr. Lewis exhibited these drawings. There were no other parties present at the time except General Newton, Mr. Lewis, and myself, to my knowledge.

WM. H. CAMMEYER.

Subscribed and sworn to before me, this 20th day of January, 1873.
JOSEPH GUTMAN, JR.,
Examiner.

96, 97 NEW YORK, *May* 29, 1873—11 a. m.

Present, Mr. Gifford and Mr. How for complainants, and Gen'l Davies for defendants.

E. S. RENWICK, being recalled and examined on the part of the complainants, in answer to interrogatories proposed to him by Thomas P. How, of counsel for complainants, deposes and says as follows:

Q. 1. State particularly what you understand from the words "sliding or telescopic sections," in the first claim of complainants' Exhibit A, being the patent sued upon, and what results and advantages are derived therefrom in the apparatus described in said letters-patent?

(Objected to as not being proper to be asked in rebuttal. All testimony from this witness with respect to complainants' letters-patent or the results or advantages of their apparatus, should have been called for upon the examination-in-chief of the witness.)

A. I understand, from the language quoted in the question, that the dam recited in the first claim of the patent is to be constructed in two or more sections, one or more of which will slide or move into the other or others in substantially the same manner as the sections of a telescope tube slide or move into or out of one another, so that the apparatus can be extended or contracted in height without materially changing the relative horizontal positions of its upper and lower ends. The advantages derived from this construction are that the height of the apparatus may be readily adjusted to different depths of water, so as to obviate the necessity of altering or rebuilding a portion of the dam when the dam is to be used in water deeper or shallower than it was first applied to. The construction, also, is advantageous in places where the depth of water varies by reason of the rise and fall of the tide, as it enables

the upper end of the apparatus to be maintained in approximately the same position relatively to the surface of the water, and consequently relative to the vessel or support of the drilling apparatus which is used in connection with such dam.

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Q. 2. Examine complainants' Exhibit D particularly, and state whether or not the cylindrical section of the dam can be raised or suspended from the chains attached to the ends of the cranes when the bridges are let down, the drilling engines in position and the machine in operation.

(Objected to on the ground that the witness has already been examined on the construction, arrangement, and operation of Exhibit D, and that any question referring to its construction, operation, or design, is not relative to any new matter brought out in the examination of defendants' witnesses or proper to be shown in rebutting testimony.)

A. Upon examining complainants' Exhibit D, I find that the cylindrical section of the dam can be raised and suspended from the chains attached to the ends of the cranes, under the circumstances mentioned in the question. It would not be as convenient or as easy to raise the cylindrical section under the conditions mentioned as it would be if the bridges and their appurtenances were withdrawn, because the bridges and drilling mechanism interfere with the direct extension of the chains from the ends of the cranes to the rings connected with the upper end of the cylindrical section of the dam; but there would be no real difficulty in holding chains extending from the lower pulley-blocks of the crane-tackles to the said rings out of their direct lines, by means of guy-ropes or guy-chains, so that the crane-tackles might be used to raise and suspend the said cylindrical section.

Q. 3. Examine defendants' exhibit Foster No. 1 and defendants' exhibit Foster No. 2, and state whether or not you find in said exhibits, or either of them, the subject-matter of either of the claims of the letters-patent, complainants' Exhibit A, and give your reasons for any opinion you may express.

A. Upon examining the exhibits referred to in the question, I

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find that they neither jointly nor severally represent or describe the subject-matter of any one of the claims of the letters-patent, complainants' Exhibit A. My reasons for this opinion are as follows: The mechanism required by the first claim of the said patent is a portable and adjustable dam, constructed in sliding or telescopic sections, substantially as stated in the descriptive portion of the patent, preceding the claim. Neither of the said exhibits, Foster No. 1 and Foster No. 2, represents or describes a dam constructed of such sections, nor, in fact, a dam of any kind whatever, or any equivalent for one; consequently the said exhibits do not, in my opinion, represent or describe the subject-matter of the said first claim.

Each of the other three claims of the patent recites a combination of mechanism, of which a dam is a material part. Neither of the said exhibits represents or describes a dam of any description, or any equivalent for it, and, therefore, neither of the said exhibits, in my opinion, represents or describes the subject-matter of either of the last three claims of the said patent.

Q. 4. Examine defendants' exhibit Newton No. 2, and state whether or not you find described in said exhibit the subject-matter of either of the claims of the patent, complainants' Exhibit A, and give your reasons for any opinion you may express in that regard.

A. Upon examining defendants' exhibit Newton No. 2, I find that it does not describe the subject-matter of any one of the claims of complainants' Exhibit A. My reasons for this opinion are as follows:

The mechanism recited in the first of said claims requires, as before stated by me, a portable and adjustable dam constructed in sliding or telescopic sections, substantially as described in the portion of the patent preceding the claim, or in other words, it describes an inclosure made in sections in such manner that one or more of said sections may be slidden or moved into or out of another substantially in the same manner as the sections of a telescope tube. Now, the said exhibit, Newton No. 2, does not describe any such contrivance; the nearest approach to such a contrivance which the said exhibit describes, is a series of cur-
100 tains of iron, composed of hinged sections, and permanently fastened at their upper lines to floats, and having the lower end of each curtain attached by falls to davits or small derricks upon the floats, so as to be lowered or raised at will. This contrivance is substantially different from that recited in the first claim of the said patent in several particulars. In the first place the contrivance, at best, is only a shield warding off the current in one direction from the works behind the two curtains, or two series of curtains, arranged in V-form, instead of being an inclosure which will protect works within it from currents in whatever directions they may proceed from. In the next place the curtains are not constructed to slide into one another in any manner, or of sections arranged to slide into or upon each other in any manner. In a dam constructed as recited in the said claim, the lower end remains a fixture, for the time being, against the bottom of the channel, and therefore forms a suitable support for drill-tubes or other appliances required for the prosecution of work within it; whereas, according to the description in said exhibit Newton No. 2, the lower ends of the curtain are raised or lowered by the operation of the davits or small derricks, as the depth of the water varies by the operation of the tide, or else the lower sections lay flatwise upon the bottom to the extent of one or more plates as the tide rises and falls, so that they would be practically useless for holding drill-tubes or other appliances in their positions for operation upon the rock.

The mechanism recited in the second claim of the said patent consists of the combination of a dam and self-anchors substantially as described in the preceding portion of the patent; the self-anchors being combined with the lower part of the dam so as to engage with the rock or bottom of the channel. Now, the said exhibit Newton No. 2 does not describe any such combination; in the first place it does not describe a dam of any description, and even if it be assumed that the curtains of iron which the said exhibit describes amount in substance to a dam, (which in my opinion is not a correct assumption,) such curtains are not com-
101 bined at their lower ends with self-anchors such, or substantially the same, as those described in the patent Exhibit A, or combined with any devices whatever in the nature of anchors for the purpose of engaging with irregularities at the bottom of the channel, and thereby tending to prevent the lateral movement of the lower end of said curtains by the operation of the currents of water. On the contrary, the described construction of the curtains of plates of iron *are* foot wide, connected by hinge joints with the lower end of each curtain attached to davits or small derricks, so as to be lowered or raised at will, is incompatible with the combination of the lower end of the curtain with self-anchors or other devices for preventing its lateral movement.

The mechanism recited in the third claim of the said patent, complainants' Exhibit A, requires, among other things, a dam or inclosure, by means of which operations within said enclosure may be protected from the action of lateral currents of water. Now, the said exhibit Newton

No. 2 does not describe a dam or enclosure of any description, nor one substantially the same as the one required by the said third claim.

The combination and arrangement recited in the fourth claim of the said patent, requires, among other things, a dam, having drill-tubes connected with it, for the purpose of guiding drills, operated within and enclosed by the dam. Now, I do not find in the exhibit Newton No. 2, any such connection or combination of drill-tubes with a dam or enclosure; on the contrary, I find that the said exhibit describes the connection of drill-tubes with a platform supported above the surface of the water, which platform cannot protect the drills or drill-tubes from the operation of currents of water.

Q. 5. If the telescopic dam were removed from Exhibit D, and a non-extensible dam, of the form of respondents' Exhibit No. 1, were substituted in its place, with self-anchors, drill-tubes, scow, and its appurtenances, the same as in Exhibit D, would or would not Exhibit D, thus modified, contain any of the improvements recited in the claims of the patent, complainants' Exhibit A, and if so, which, and give your reasons for your opinion.

102 A. If Exhibit D were modified, as stated in the question, it would not contain, in substance, the improvement recited in the first claim of the said patent, because the dam, forming part of Exhibit D, when modified, would not have the peculiar construction recited in the said claim, viz, the construction in sliding or telescopic sections. Exhibit D, modified as stated in the question, would in my opinion, embody, in substance, the improvements recited in the last three claims of the said patent Exhibit A, because it would contain a dam which was substantially an equivalent for the dam represented in the drawings of the patent, when combined with the other members recited in the said claims, and the said other members would be represented in Exhibit D by corresponding members, as stated in my answers to questions 4, 5, and 6 of my first examination in this case. Thus the improvement recited in the second claim of the said patent consists of a combination of what are called in the patent the self-anchors, with the dam, in the manner described in the patent. Now, the self-anchors would be combined with the dam of Exhibit D in the same manner, whether the said dam had its upper part constructed as a telescopic section, or constructed as a fixture to the lower part, as in defendants' exhibit No. 1; the self-anchors in either case being connected with the lower end of the dam, and in either case adjusting themselves to the irregularities of the bottom of the channel, and in either case tending to prevent the dam, with which they are connected, from being moved laterally by the operation of currents of water, so that all the functions which the dam and the self-anchors perform, in connection with each other, are substantially the same in both cases, and in both cases a dam or enclosure is held in position by the operation of the combination.

As respects the combination recited in the third claim, the boat's supports or floats, and the anchors, and the dam of Exhibit D are combined substantially in the same manner, whether the dam be constructed with an upper telescopic section, as represented by Exhibit D, before modification, or with the upper part of the dam a fixture to the lower part, as represented by respondents' exhibit No. 1; the combination of

103 the dam with the other members being, in both cases, effected through the intervention of the tackles while the dam is being raised and lowered from the bottom, and through the intervention of the drilling mechanism while the dam is stationary upon the bottom and the tackles are disconnected; therefore, in my opinion, Exhibit D,

as modified, would contain the combination recited in the third claim, just as it would if the upper telescopic section of its unmodified dam were not used, on account of the shallowness of the water, although it might be present for use.

As respects the combination recited in the fourth claim, the dam of Exhibit D, as modified, would be combined with the other members of said exhibit, corresponding with the other members recited in the said claim, in the same manner as the dam of Exhibit D, unmodified, is combined; it would hold the drill-tubes in their positions in the same manner as the unmodified dam; it would also enclose the drills in the same manner, and enable operations to be performed within its enclosure in the same manner as a telescopic dam. Moreover, the windlasses, chains, and boats, when combined with the non-extensible dam, could be used in the same manner for raising and lowering the said dam from and to the bottom of the channel, and for holding the drilling mechanism above water in the same positions relatively to the dam and drill-tubes below water; therefore, the non-extensible dam is, in my opinion, an equivalent for an extensible one in the combination and arrangement recited in the fourth claim, which, as I understand it, does not contain any language requiring the dam recited in it to be constructed, of necessity, of telescopic sections, and the said Exhibit D, as modified, would, in my opinion, contain the combination and arrangement recited in the said fourth claim, for the same reasons as were given by me in my answer to question 6 of my first examination.

Q. 6. What can you say as to whether the apparatus, described in the letters-patent, complainants' exhibit A, would be practically useful for the purpose stated in said patent, and give your reasons for any opinion you may express in that regard?

104 (Objected to, on the ground that the witness has not been shown to be an expert in submarine drilling, or in operations of the character intended to be performed by the apparatus in question.)

A. I have no doubt that the apparatus described in the patent would be practically useful for the purposes therein stated, as nothing is described which would prevent its being practically used for such purposes, and the means described of holding the boats or floats in their positions are sufficient to enable the drilling mechanism carried by such boats to be held as firmly as is necessary in such practice.

Q. 7. What can you say, as to whether such an apparatus, constructed as described in said patent, would be sufficiently stable in a tide-way or current for the practical operations mentioned in said patent, and give your reasons?

(Objected to, as the witness is not shown to be qualified by experience or practice to testify as an expert as to the matters to be inquired into.)

A. I have no doubt that an apparatus, constructed as described in the patent, would be sufficiently stable in a tide-way or current for the practical operations mentioned in the patent, because its form is well adapted to present a comparatively low resistance to currents in the direction of its length. The self-anchors at the bottom afford an efficient means of preventing a lateral movement of the lower end of the dam, and the anchors described, as combined, with the boat or floats and the windlasses, afford an efficient means of holding the floats and the upper part of the dam as nearly over the lower part as is practically necessary for the drilling and removal of the rock. Even if the current should, at times, be crosswise with the length of the dam, the dam and the boats could be held in their positions by the means provided, it

being necessary only to increase the number of such means as the strength of the current should render expedient, which increase in number would not, in my opinion, require anything more than the
105 exercise of ordinary skill and judgment on the part of the persons who use the apparatus.

Q. 8. Examine complainant's exhibit E, and state whether or not you find any device for securing any of the self-anchors which are designated in the patent by the figures 3, 3, at any desirable height; and if so, state what it is?

A. Upon examining the model Exhibit E, I find that a set screw is provided for clamping one of the self-anchors corresponding with those designated by the figures 3, 3, in the patent in any position in which it may be placed, or with its end projecting to a greater or less distance below the lower rim of the dam.

Further examination of witness adjourned to Monday, June 2, 1873, at 11 a. m.

NEW YORK, *June 2d*, 1873—11 a. m.

Counsel present as before.

Examination of the witness E. S. RENWICK continued:

Q. 9. Have you made or witnessed any experiments tending to show what would be the effect of a horizontal current running against the side of a dome or dam of the form of the lower section of the enclosure for the drills in Exhibit D? If so, state the nature of those experiments and the results, and produce, if you can, any apparatus used in such experiments?

A. In connection with Mr. William C. Hicks, I made a series of experiments to determine the practical effect of a current of water in a stream against an enclosure having the form of a dome, surmounted by a short cylinder, which was connected with the dome by a telescopic joint, so as to enable the cylinder to be raised or depressed. The apparatus had the form of the enclosure for the drills in Exhibit D, and was fitted at its lower edge with a series of projections, corresponding with the self-anchors of that exhibit. I produce the apparatus, and also the wooden slab, representing a rough bottom, in connection with which the apparatus was tested.

106 The experiments were made by attaching the slab to a piece of scantling, and lowering the slab gently into the current of the stream.

In the first series of experiments the apparatus was tried with the cylinder projecting above the rim at the upper end of the dome 1½ inches; in the second series of experiments the cylinder was depressed so that its upper edge corresponded with the edge of the rim at the upper side of the dome. Each series of experiments consisted of four experiments, the slab in each series being turned so as to present each of its sides in succession to the current of water. The result of the experiments was that in every instance the dome-shaped enclosure was overturned by the action of the current.

Q. 10. State whether, in your opinion, as derived from those experiments, a dome or dam of the form shown in Exhibit D, and used for the purpose for which Exhibit D was designed, would be overturned by a strong current, if not held on by its own weight, or by some other force or power than the action of the current upon it?

A. The experiments made convinced me that a structure of the form of Exhibit D, when used for the purpose for which Exhibit D was used, would be overturned by a strong current if it were not held in

place by its own weight, with or without some other means than the pressure of the current upon it.

(Counsel for complainants offers in evidence the apparatus testified of as having been used in the experiments narrated in the last but one preceding answer, and also the slabs referred to, as having been used in connection therewith, and the same are marked "Complainants exhibit K," and "Complainants' exhibit L," respectively, J. G., jr., U S. examiner.)

Q. 11. What can you say as to whether or not the clamping of the vertical bars attached to the bottom of the enclosure for the drills in Exhibit D at all impairs their action as self-anchors, as described in the letters-patent, complainants' exhibit A, for securing the dam against lateral pressure?

107 A. The clamping of the instrumentalities mentioned in the question does not impair their action as self-anchors, as described in the letters-patent referred to, but enhances their action, because the effect of clamping them after they have been let down to take their hold, is to subject them to a portion of the weight of the apparatus, and thus cause them to hold more firmly than they would do if subjected only to their own weight.

Cross-examined by General Davies:

X Q. 12. What use or advantage in the operation of a machine such as that represented in Exhibit D, would result from having the upper section of a dome or dam made in a sliding or telescopic form, and so constructed as to be moved in or out at pleasure?

A. Several advantages would result. The dam could be more readily transported from one place to another, because the upper section could be depressed or lowered into the lower section, so that the vertical height of the whole enclosure would be less. The same apparatus could be used in water of different depths without the necessity of making any change in it. In places, also, where the tide rose and fell a considerable distance, the same apparatus could be used to afford the greatest protection to operations within it under all the circumstances that would occur from variations in the depth of the water, due to the rise and fall of the tide.

X Q. 13. What necessity for reducing the height of the dam is required for its transportation in an apparatus such as described in Exhibit D?

A. If the dam bear the same proportions to the apparatus for raising and lowering it as the parts of the model (Exhibit D) do, there is no absolute necessity of reducing the height of the dam in transporting it from place to place in connection with the scow and its appurtenances.

X Q. 14. Is it necessary, for the successful operation of the machine, such as that described in Exhibit D, to have the height of the dam adjusted during different stages of the tide, while the machine is in operation?

108 A. Whether it would or would not, would depend upon a variety of circumstances which are not mentioned in the question. If, for example, the tide should rise and fall a very short distance, it would not be necessary to vary the height of the dam after it was once adjusted properly to the depth of the water. Again, if the dam were once adjusted to the depth of the water, and the fall of the tide should not be such as to bring the bridges in contact with the upper end of the dam, it would not be necessary to adjust the height after the first adjustment. Or, if the current should be so slight at the surface of the

water as not to affect operations when the water overtopped the upper end of the dam, it would not be necessary to adjust the height of the dam after its first adjustment to the depth of the water at low tide. If, however, the current at the surface of the water should be so strong as to affect the operations to be performed, in case the upper end of the dam was below the surface of the water, and the rise and fall of the tide should be such as to cause the bridges to come in contact with the upper end of the dam as the tide fell, then it would be necessary to adjust the height of the dam during the fall of the tide, and to adjust it again during the rise of the tide.

X Q. 15. How strong a current do you estimate would so interfere with the operation of the machine, as to require that the upper surface of the dam should be above the level of the water?

A. I have made no estimate. In order to enable me to make an estimate, I should either have to experiment myself, or should have to have access to the records of experiments made by others, and I have neither of these means of making an estimate.

X Q. 16. Do you not know that this machine has been used and operated successfully, the whole of the dam being submerged in the strongest currents that exist in and about the harbor of New York, and especially in Hell Gate?

A. I do not know the facts myself, but I have heard that the apparatus has been used at Hell Gate with the dam (including both sections) at times submerged.

109 X Q. 17. Will you say that it could not be used, as described in the last question, in the strongest currents that are to be found at Hell Gate?

A. Certainly not; because I have had no means whatever of informing myself on the subject other than hearsay.

X Q. 18. Is it necessary, for the practical working of such a machine as that represented in Exhibit D, that the top of the upper section of the dam should be always in the same relative position with the vessel or support of the drilling apparatus?

A. It is certainly not necessary that the top of the dam should be in the same vertical position, relatively to the vessel or support of the drilling apparatus, because there may be a certain amount of play or movement of the latter to the former, so long as the bridges do not strike the upper end of the dam in such movement. It is also not necessary that the upper end of the dam should be identically in the same position horizontally, relatively to the support of the drilling apparatus, because the flexibility of the means employed to connect the drills with the drilling engines, will permit more or less horizontal movement of the vessel or supports for the drilling apparatus, relatively to the upper end of the dam, but there must be a limit to the amount of variation in position, which limit would depend upon a variety of circumstances; and there is no doubt that the nearer the drilling-engines can be maintained vertically above the drills, the more advantageous would be the result.

X Q. 19. Are not the greater number of the drill-holes, represented in Exhibit D, so placed that no alteration of their position, relatively, to the boat or support, can be made when the dam is once placed in position for operating?

A. Certainly not, because the boat or support can be moved horizontally after the dam is fixed in its position, by the use of the self-anchors at its lower rim, and because the action of the tide would undoubtedly cause the boat or support to the drilling apparatus to move slightly hor-

izontally, the effect of which would be to change the positions of all of the drill-tubes in horizontal directions, relatively to the support
110 of the drilling mechanism above water. In this answer I have spoken of the drill-tubes as if they made the change by moving relatively to the boat; the actual operation being that the boat or support of the drilling mechanism above water is the thing moved, which causes the change in the relative positions of the tubes to the support of the drilling mechanism.

X Q. 20. Is it not a result of the construction of the complainants' machine, as described in their letters-patent, that the upper part of the dam in that machine should be at all times connected with and suspended from the boat, support, or float, and always in the same relative position to that boat, support, or float?

A. If the apparatus is constructed identically as represented in the drawings of the patent, without any provision for clamping the sections of the dam together, the upper part of the dam would be at all times connected with and suspended from the boat support or float, and the uppermost end or section of the dam would always be in the same relative position to such boat support or float.

X Q. 21. Please specify particularly what portions of the machinery, represented in Exhibit D you class under the term "drilling apparatus," in your answer to your first redirect question?

A. The drilling-apparatus which I had in view in making that answer was the drilling-engines which are mounted upon the bridges of Exhibit D.

X Q. 22. Do you find in Exhibit D any appliances for attaching the chains on the upper end of the crane to the upper section of the dam, when the bridges are lowered and the machine is in position for operation?

A. In Exhibit D the crane-chains are not long enough to permit the pulley-blocks to be lowered sufficiently to be hooked directly into the rings, near the upper end of the cylinder, when the dam is as low as it is when resting upon the stool, and the chains or ropes which would be required to connect the crane-tackles with the upper section of the dam do not appear to be present in Exhibit D.

X Q. 23. Are not the chains, represented in the model Exhibit
111 D as attached to the upper part of the cranes, too short to permit the hook and pulley-block at their extremities to reach to the bottom of the bridges?

A. They are.

X Q. 24. Do you find represented in said Exhibit D any guys, such as those you spoke of in your answer to the second redirect interrogatory, for the purpose of guying the connecting chains between the pulley-block and the upper extremity of the dam, which was suggested in said answer?

A. I do not. The guy-ropes or guy-chains which I referred to would be temporary expedients, which, like the connecting chains or ropes between the crane-tackles and the rings of the dam, would be removed when they were not wanted.

X Q. 25. If the upper section of this dam, as represented in Exhibit D, were intended to be moved and adjusted while in operation, to suit varying stages of the tide, would not such connecting chains and guys be a necessary and material part of the appliances for such purpose, and have to be constantly in use?

A. Under the circumstances mentioned, the connecting chains and guys would be necessary at the times adjustment was to be made with

the bridges lowered. They would not have to be continuously in use, but only in use at the times when the adjustment was to be effected, which might be once or twice during the rise and fall of the tide.

X Q. 26. Would not such a device for raising or lowering the upper cylinder of this dam, as suggested in the said answer, be an unmechanical, clumsy, and awkward contrivance for accomplishing the result desired?

A. It would be neither unmechanical nor clumsy, and would not be awkward, in view of the means provided in Exhibit D for doing the work of raising and lowering.

There is no doubt that if the sole object of the means employed for raising weights upon the scow of Exhibit D was to raise or lower the cylinder of the dam, means might be employed which would be more convenient for the purpose than the cranes and the connections of their tackles with the said cylinder; but in view of the fact
112 that the cranes will perform other operations than the movement of the cylinder with great facility, and that they are a good apparatus (although not the best that could be used) for the movement of the cylinder, they are probably the most convenient lifting-mechanism that could be used upon the scow, taking in view all the purposes that it may be expedient to use lifting-apparatus for.

X Q. 27. Do you believe, or have you any reason to believe, that in the machine which is represented by Exhibit D, when the dam was placed into position for operation, and the bridges were lowered, any such movement of the upper cylinder, in the manner and with the additional appliances as suggested in your previous answers, has ever been made?

A. I have no information upon which to found a belief as to either the movement or the absence of movement of the cylinder under the circumstances mentioned, and I never saw the apparatus in use myself.

X Q. 28. In attempting to raise the upper section of this dam, represented in Exhibit D, by the means and appliances suggested in your testimony, would not any motion of the boat, tending to throw the chains out of the direct line of suspension cause the upper cylinder to jam within the lower, and render such raising impossible?

A. No; I take it for granted that this apparatus is constructed in a practical way, so that the upper cylinder would not be jammed by any motion of the boat, tending to throw the chains, as stated in the question, but that such motion must amount to a certain extent, in order to produce jamming. Now, in view of the means that are provided for holding the boat in its position horizontally, as represented by the model, I think that there need not be movement enough to cause the jamming of the cylinder, if ordinary care and skill were exercised in raising and lowering.

X Q. 29. Do you take it for granted that the machine which is represented by Exhibit D was constructed in a practical manner to admit the raising and lowering of the upper section of the dam, under
113 the circumstances and in the manner suggested in your answer to the aforesaid second redirect interrogatory?

A. I take it for granted that the apparatus was constructed in a practical manner that would admit of the upper section being raised and lowered while it was in the water, but I have no means of knowing, or of forming an opinion as to whether the constructors of it had, or had not, in view the raising and lowering of it by means of connecting-chains controlled by guy-ropes or guy-chains, when the bridges were down, as stated in the question 2, to which my answer was given.

X Q. 30. Do not the specifications of complainants' letter's-patent claim the use of tubes as guides for drills?

A. I do not understand that any one of the claims of complainants' letters-patent claims broadly the use of tubes as guides for drills, but that the fourth claim of the letters-patent requires drill-tubes suitable for guiding drills as members of the combination recited in that claim; the use of drill tubes without the other members not being claimed.

X Q. 31. To what part of the machine described in complainants' letters-patent are the drill-tubes affixed?

A. As represented and described in the patent, they are affixed to the lowermost section of the dam through the intervention of what are termed braces.

X Q. 32. Are not two holes represented in the plates of defendants' exhibit Foster No. 1 an equivalent to, and do they not produce the effect of, a tube as a guide for a drill?

A. The plates with the holes in them do act as guides for the drill, and are the equivalent of a drill-tube for the purpose of guiding the drill.

X Q. 33. Is not the machine represented in defendant's exhibit Foster No. 1 provided with, and does it not rest upon, adjustable legs?

A. It is so provided, and rests upon the said adjustable legs.

X Q. 34. Are those legs an equivalent of or do they perform the functions of the self-anchors represented in complainants' letters-patent?

114 A. The adjustable legs of Foster exhibit are substantially the same, considered by themselves, as the self-anchors represented in complainant's letters-patent considered by themselves, but perform one function which the self-anchors represented in the patent do not perform unless the latter were clamped by a set screw, such as represented in the model Exhibit E, or were clamped as represented in Exhibit D. On the other hand, the self-anchors described in the patent maintain not only the drill guides or tubes from moving laterally, as the adjustable legs of exhibit Foster No. 1 do, but the former, in addition, hold in its position an enclosure surrounding the drill guides or tubes, whereas no such enclosure is found in Foster Exhibit No. 1 for the legs to perform that function for.

X Q. 34. Do you find in Exhibit Foster No. 1 a set of chains attached to pins driven in the rocks for the purpose of holding the said machine in position?

A. I do.

X Q. 35. Look at Exhibit Foster No. 2, and see if you there find a boat support or float combined with the drilling-machine represented in Exhibit Foster No. 1?

A. I do.

X Q. 36. Do you not see there represented anchors or chains for moving such boat?

A. I do.

X Q. 37. Do you there see a combination and arrangement of windlasses, chains, and a boat with such drilling-machine, so that a drill can be operated?

A. I do not see the windlasses; but, assuming that there are windlasses on the boat for the purpose of operating upon the chains which are connected with the anchors, and that there is a windlass connected with the hoisting-crane for hoisting the drilling-mechanism from the bottom, then there is, in the said Foster exhibit, a combination and arrangement of windlasses, chains, and a boat with the drilling-machine represented in that exhibit so that a drill can be operated.

X Q. 38. Is not Foster No. 2 a portable and adjustable machine for subaqueous drilling?

(Objected to as immaterial.)

115 A. It is.

X Q. 39. Is it necessary or important, in the machine described in Foster No. 2, that the upper part of the drilling-machine should be always in the same relative position to the boat or support upon which the drilling-engine is worked?

A. It is not necessary or important that the upper part of the said machine should be always in the same relative position to the said boat or support, but it is important that the position of the boat should not be changed so far relatively to the drilling-machine as to prevent the proper operation of the drill from the boat.

X Q. 40. If the combination of machinery and boat represented in Foster No. 2 should be added to by enclosing the drilling *of* platform represented in Foster No. 1 in a hemispherical case, open at top and bottom, and rigidly attached to the drilling-platform, would such machine thus added to, be, in your opinion, an infringement of the complainant's letters-patent?

(Objected to as not being referred to on the direct examination.)

A. As I understand the modified construction described in the question, I should say that it embodied, in substance, the three combinations recited in the last three claims of the complainants' patent, but did not embody the peculiar construction of the dam recited in the first claim of the complainants' patent.

X Q. 41. You consider, then, that the complainants' letters-patent covers the use of any manner or form of dam in combination with any of the other mechanisms described in those last three claims?

A. No, I do not; but I consider that every combination of a dam which is substantially the same as the complainants' when combined with the other mechanisms or their equivalents, recited in the said claims substantially as described in the patent, would embody, in substance, the combinations recited in the said claims, although the form of the dam might differ from that represented in the drawings of complainant's patent. I further consider that the employment of a dam not

116 constructed in telescopic sections in combination with some one of the mechanisms recited in the last two claims without the others therein recited, and without the self-anchors or some equivalent of them, would not embody any one of the combinations recited in the last three claims.

X Q. 42. Then, do you consider a hollow, hemispherical piece of metal, open at top and bottom, resting upon the bottom of the river and not suspended from a boat, a dam that is substantially the same as the dam described in complainants' letters-patent?

A. Whether it is or is not depends upon circumstances. Thus, a hemispheric enclosure, open at top and bottom, resting on the bottom of a channel, is not the equivalent or substantially the same thing as a dam constructed of telescopic sections, with the said sections extended, but it would be the equivalent for a telescopic dam placed in the same circumstances with all the sections closed, assuming that in each case the height of the enclosure was the same. Again, if the hemispheric enclosure were combined with some other mechanism, as, for example, self-anchors, it would be the equivalent, in that combination, of a telescopic dam, combined with self-anchors, with the sections closed, as they would be if there was no boat from which the telescopic dam was suspended. If, however, it was desired to extend or contract the height of the dam,

then a hemispheric inclosure such as is stated in the question would not be the equivalent of a telescopic dam for such purposes.

X Q. 43. Would it not be possible for you to give a direct affirmative or negative answer to the last question, without assuming, in your answer, the existence of conditions that are not named or referred to in the question?

A. I do not deem it would be possible to give a direct affirmative or negative answer to the question, without rendering such answer liable to misconstruction.

X Q. 44. Question repeated, with request that the witness shall confine himself entirely to the conditions spoken of in the question itself.

(Objected to, on the ground that it is already fully and fairly answered.)

117 A. Upon rereading the question, I perceive that it may be answered in other language, which amounts, practically, to the same thing, as follows, viz: the hemisphere enclosure, resting upon the bottom of the river, and not suspended from a boat, would be substantially the same as the dam described in complainants' letters-patent, as recited in the last three claims thereof, under the same circumstances, but would not be substantially the same thing as the telescopic dam described and recited in the first claim of the patent.

X Q. 45. Then the complainants, in their letters-patent, have patented more than one claim, have they not?

A. No, they have not; what they have patented, or, as I understand that language, what they have claimed in the patent is, first, one peculiar dam, as structure by itself, viz, a dam constructed in sliding or telescopic sections; secondly, they have claimed three continuations of a dam, with other instrumentalities, which combinations are recited respectively in the second, third, and fourth claims of the patent; and, as far as I can judge from the language of the patent, there is nothing in it to convey the idea to me, as an expert, that the invention was to restrict those combinations to a telescopic construction of dam, particularly in view of the fact that the self-anchors, drill-tubes, &c., which are combined with the dam, will perform their functions equally, whether the dam be constructed in telescopic sections or not

Further cross-examination of witness adjourned to June 3d, 1872, at 11 a. m.

TUESDAY, *June 3d*, 1873—11 a. m.

Counsel present as before.

Cross-examination of the witness, Mr. E. S. Renwick, continued:

X Q. 46. Do the complainants' letters-patent, in the second,
118 third, and fourth claims of the patent, use the words "a dam," or do they not use the words "the dam," in the combinations described in such claims?

A. The words used are "the dam."

X Q. 47. In the third and fourth claims of said letters-patent, do they not add, after the words "the dam," the words "as above described?"

A. The words "as above described" are found in the said two claims in the order stated.

X Q. 48. Is there any dam mentioned or described in the said letters-patent, other than a dam made in telescopic or sliding sections?

A. The only dam that is mentioned or described in detail in the specification is one that is made in telescopic sections.

X Q. 49. Is there any dam mentioned or described in said letters-

patent, not in detail, otherwise than one made in sliding or telescopic sections?

A. The words "the dam" are used in the specification in various places, without any words connecting with them, to the effect that the dam mentioned is a telescopic dam, but there is no description of the construction of a dam in any other manner than the construction of it in telescopic sections.

X Q. 50. The machine described in complainants' letters-patent affords, does it not, a fixed and firm support for drill-tubes, used as guides for drills in submarine drilling?

A. When the entire machine is used, in one of the forms mentioned, the drill-tubes are firmly supported by the machine, of which they form part. In another of the forms which is mentioned, the drill-tubes are maintained in their positions at one portion of their length, but they may be inclined, as may be required, for drilling in inclined directions.

X Q. 51. In either case, the patent requires, does it not, that the drill-tubes should be fastened to the lower section of the dam described in complainants' letters-patent?

A. Not necessarily. The only mode that is described in the patent of fastening the drill-tubes in their positions is by connecting
119 them with the lowermost section of the dam that is represented in the drawings, and described in the patent, but it does not necessarily follow that a person would avoid using, in substance, the invention described in the patent, by fastening the drill-tubes in some other manner, provided he used the other appliances required by the claims.

(All after the words "does not necessarily follow" objected to as not responsive to the question, and as giving an opinion of the witness when interrogated on a question of facts.)

X Q. 52. Does not the lowest section of the dam, described in complainants' letters-patent, when provided with drill-tubes as guides for drills, perform the same functions as those of the machine represented in Foster No. 1.

A. It performs the same functions, and more.

X Q. 53. What are the other functions it performs in addition to those of Foster No. 1?

A. It forms an enclosure which protects the drilling mechanism, and also enables a diver to descend in comparatively still water, notwithstanding the strength of the current in which the apparatus may be located, for the purpose of doing any work that may be required in reference to the drills. It also forms an enclosure containing comparatively still water within which divers may operate for the purpose of removing the fragments produced by blasting after the drill-holes have been charged and the charges exploded.

X Q. 54. Does a drill working in a fixed and rigid tube require any protection other than the tube to prevent the interfering action of the currents of water upon it while it is working?

A. Whether it does or not depends upon circumstances. For example, if the drill-tube does not extend wholly to the top of the water, and is operated by a flexible connection with drill mechanism, mounted on a float above, it is possible that the action of the strong currents of water upon such flexible connection may materially affect the work of the drill.

120 X Q. 55. Do you suppose that in and about the harbor of New York currents are found so strong as to interfere with the operations of a drill under the circumstances mentioned in your last answer?

A. I have been informed that the current of water in Hell Gate some-

times exceeds eight miles an hour, and I have no doubt that the action of such a current upon a flexible connection between a drill and drill mechanism, mounted upon a boat or float, would interfere with the operation of the drill. I do not mean to say that such a current would prevent a drill from being operated at all; but I have no doubt that it could be operated to materially better advantage if the drill connections were protected by an enclosure. Then, again, a drill may have to be changed, and if the drill-tubes do not extend up to the surface of the water a diver would have to descend for the purpose of entering the drill into the drill-tube. Now, if the current amounted to eight miles an hour, I believe it would be practically impossible for a diver to descend into it and enter the drill into the drill-tube; so that the current would materially interfere with the operation of the drill.

X Q. 56. Why do you say that the machine provided with curtains, described in Exhibit Newton No. 2, forms a V-shaped shield, and gives protection against currents only in one direction?

A. I said so because the description gave that idea to my mind, the statement being that "two cylindrical floats of sufficient buoyancy, made of boiler-iron, are placed say thirty feet from centre to centre. Towards their extremities they are inclined towards each other until they meet. * * * Now, the form that is given to my mind by that description is a V-form, the two cylindrical floats converging until their extremities meet.

X Q. 57. Does that description provide for only two of these extremities from these two floats being brought together?

A. That is all that I understand from the description.

X Q. 58. How many extremities has each of these supposed cylinders or floats?

A. Two, of course.

121 X Q. 59. If all the extremities of these two cylinders were brought together, would they not then form a figure resembling two V's, with the upper ends placed together?

A. I cannot perceive how two cylinders could be so arranged, because, if the extremities of each end of the cylinders were brought in connection with those of the adjacent cylinder, the two cylinders would touch each other throughout their entire length. In order to imply the form of a double V, something would have to be added to the description which is not found therein; namely, a statement to the effect that the floats were not only cylindrical, but were bent horizontally, or curved; the idea of including the extremities toward each other not conveying to my mind the idea that the cylinders themselves are curved or bent horizontally, so as to form a curve or two sides of a polygon, or some quadrilateral figure.

X Q. 60. If two floats were arranged, as suggested in my last question, with their four extremities united, so as to present the form of a double V, and provided with folding curtains along the whole length of both of such floats, would not the effect of such curtains being let down, so that their lower portions would rest on the bottom of any river or channel, be that of a dam?

A. If the apparatus were made as assumed, the effect would be, more or less, that of a dam, as respects the protection of the space enclosed within it from the action of strong currents, but it would be a very inferior contrivance, and could not be used for purposes which the dam is capable of being used for.

X Q. 61. Would not such a dam as that described in X Q. 60 be port-

able in the sense in which the machine described in complainants' letters-patent is claimed to be portable?

A. The contrivance described in X Q. 60 would be portable in the same sense that the dam described in complainants' patent is portable.

X Q. 62. Would it not be adjustable, so that it could be adapted to varying depths of water?

A. The contrivance would be adjustable, (but in a substantially
122 different manner from that described in the plaintiffs' patent,) so that it could be adapted to varying depths of water.

X Q. 63. Is not a dam, such as that supposed in X Q. 60, attached to and suspended from a floating support?

A. The curtains, composing the contrivance described in X Q. 60, would be suspended from a floating support.

X Q. 64. Would not the lowest section of such a machine as that suggested in X Q. 60, when in use for the purpose for which it was intended, rest upon the bottom of the river or channel in which it was used?

A. The series of the lower sections of the curtains would rest upon the bottom of the channel unless they were raised by the "falls" attached to davits or small derricks upon the floats.

X Q. 65. Would not a machine such as that suggested in X Q. 60, moored in a tideway, and with its curtains let down to the bottom of a channel, adjust itself to the action of the rise and fall of the tide, without the intervention of the derricks or any other lowering machinery?

A. It would, if the curtains did not become fouled by interference with each other.

X Q. 66. Does not the description of the machine given in Newton No. 2 contemplate the use of anchors and chains, or their equivalents, in combination with this dam, and the support or float from which it is suspended?

A. The use of the words "moored securely," in the description, conveys to my mind the idea that the ordinary means of moving (such as anchors and chains) are to be used in combination with the float, for the purpose of holding it and the upper ends of the curtains connected with it in their positions.

X Q. 67. Is there not described in exhibit Newton No. 2 a stable and fixed platform for supporting drills working in tubes as guides?

(Objected to as irrelevant.)

A. There is a description, in the said exhibit, of a platform above the water which is stable and fixed, and is for the purpose of supporting the drilling mechanism. There is also a statement that the drills
123 may be made to work in hollow iron cylinders reaching from the platform to the rock.

X Q. 68. Is not such platform provided with adjustable legs on which it rests?

(Same objection.)

A. The description amounts to a statement that the platform is so provided.

X Q. 69. Have you ever had any practical experience or actual knowledge, by witnessing the operation of a machine such as that described in complainants' letters-patent?

A. I have never had any experience with the working of such a machine; I have seen what appeared to be parts of substantially such a machine in the harbor of New York, but have never been near enough to it to know, from my own observation, that it was substantially such a machine or not, or to know what operations were performed with it

X Q. 70. Your opinion, then, as to the practical usefulness of such an apparatus as that described in complainants' letters-patent, as expressed in your answer to question 6 in your redirect interrogatory, is entirely a matter of theory, is it not?

A. It is not, as I understand the meaning of the language of the question, because my opinion is based upon actual knowledge, derived from submarine operations in a tide-way, and upon observation of facts which I have noticed.

X Q. 71. Did you ever have experience of, or observe the operations of, any machine constructed in the manner described in complainants' letters-patent, or in any manner resembling the same?

A. The language of the question, it strikes me, is exceedingly broad and vague, the language, "in any manner resembling the same," being apparently broad enough to include the operation of any kind of an enclosure for submarine operations. Now, I have had experience with the operation of an enclosure in submarine operations for the purpose of enabling iron to be drilled under water, on a
124 movable object in a rapid tide-way, although such enclosure was a substantially different one from that described in complainants' patent, and was not combined with other members which are described in the complainants' patent.

X Q. 72. Have you ever seen the operations of any machine used for submarine drilling, of which a dam, made in telescopic or sliding sections, proved a part?

A. Not to my knowledge.

X Q. 73. In the working of a machine, such as that described in complainants' letters-patent, it is intended, is it not, that the lowest section of the telescopic dam should be firmly and rigidly held upon the surface to be operated on?

A. If the apparatus is constructed in every respect as described in complainants' patent, and the members of it are used as therein described, the lowermost section would be prevented from moving laterally by the operation of what are called self-anchors, and would be prevented from rising by its own weight, and that of the parts which are connected with it, but a portion of the invention might be used without another portion, and in such event the lowermost section would be prevented from moving laterally by its own weight, and that of the parts connected with it.

X Q. 74. Do not the complainants' letters-patent provide for and describe the use of anchors and chains, in addition to the so-called self-anchors, for the purpose of holding the lowest section of their dam in position when in use?

A. The letters patent do provide for the use of anchors and chains of the ordinary description, connected with the lowermost section of the dam, in addition to what are termed the self-anchors, but it does not necessarily follow, as I understand the description, that such supplementary anchors and chains are required in order that the invention may be used.

(All after the words "but it does not necessarily follow," objected to as not responsive to the question.)

125 X Q. 75. The upper section of such a dam as that described in complainants' letters-patent would be connected with the boat, support, or float combined with the apparatus while the machine was in operation, would it not?

A. If the apparatus is constructed in all respects as described in complainants' letters-patent, and used precisely in the manner therein de-

scribed, the uppermost section of the dam would be connected with the boat, support, or float while the machine was in operation.

X Q. 76. Is it possible to moor a boat, or other floating object of such a size as would be required for use in connection with such a machine as that described in complainants' letters-patent, in such a current as is found at Hell Gate, so that it would be stationary?

A. Inasmuch as the tide rises and falls, it would be impossible to moor the vessel so that it should be absolutely stationary; but if ordinary care and skill were exercised in mooring the vessel, and in attending to the mooring chains during the rise and fall of the tide, I have no doubt that the boat or float could be held sufficiently stationary for practical purposes.

X Q. 77. Would not a current impinging upon the ends or the sides of a telescopic dam, such as that described in complainants' letters-patent, have a tendency to cause the joints to jam and prevent the free movement of such dam?

A. The tendency would, of course, be to increase the resistance to the movements of the sections at their joints.

X Q. 78. Would not any motion of the boat float to which the upper portion of the telescopic dam is suspended interfere materially with the operation of such a dam when placed in a position for working?

A. If the movement were sufficient to interfere with the operation of such a dam, of course interference would take place, but there is no reason why such an extent of movement should be permitted, if the persons who had charge of the apparatus exercised ordinary care and skill.

126 X Q. 79. How much motion do you suppose would be allowed the boat support or float of such an apparatus as that described in complainants' letters-patent, without interfering with the practical working of the machine?

A. The extent of motion would depend upon the depth of the water and the number of the sections of the apparatus; the greater the depth, the greater the amount of movement which would be permissible. Assuming that the depth amounted to 20 feet, and that the dam was made in five sections, as represented in the drawing, I should suppose that a horizontal movement of the boat of two feet at each side of the mean position might be permitted, if the apparatus were constructed as a constructor of judgment would make it.

Further cross-examination of witness adjourned to Monday, June 9th, 1873, at 11 a. m.

MONDAY, *June 9th*—11 a. m.

Counsel present as before.

Cross-examination of the witness E. S. Renwick continued:

X Q. 80. Returning to the experiments described in your answer to question 9 on the redirect, do you mean to be understood as saying that there would be no downward pressure produced by the action of a horizontal current impinging on such an object as complainants' Exhibit K with which such experiments were made?

A. I do not recollect making any statement in reference to pressure, but I may say that I have no doubt that the action of an external horizontal current upon a structure having the form of Exhibit K would produce some downward pressure, the exact amount of which I am not able to state. The experiments, however, satisfied me that the action of a horizontal current to overturn such a structure was greater than the downward pressure.

(All after the words, "the experiments, however," objected to as irresponsive to the question.)

127 X Q. 81. Have you ever made any experiments concerning the action of the currents upon a dome-shaped apparatus with any apparatus other than Exhibits K and L?

A. No.

X Q. 82. When was your attention first called to the set-screw represented in complainants' model Exhibit E, as affixed to the lower edge of the dam on the inside and working against one of the so-called self-anchors?

A. I do not know that I can state the day with certainty, but my impression is, it was either on the first day of my redirect examination or a day or two previously.

X Q. 83. Have you calculated or determined the pressure that a horizontal current at a given rate would produce per square foot upon a surface directly opposed to its motion?

A. I have not.

X Q. 84. Look at the drawing now shown you, and state if that does not exhibit two cylindrical floats 30 feet from centre to centre, according to the scale given upon the drawing, towards their extremities, inclined towards each other until they meet, forming one float 160 feet long and 40 feet wide.

A. It does not, as I understand language. It represents views of two different floats, each of what may be termed of annular form; the one having its ends of a V-form, the other having its ends curved; both having a cavity or opening between their hollow sides. It would be impossible to tell, from this drawing alone, whether the section of the sides of the floats is a circle or not, as the same drawings represent objects, the sections of whose sides are circular or are curved at the top, and of any other form whatever below their greatest breadth. The length of each of the floats, according to the scale, is 160 feet, the extreme breadth is 40 feet, and the distance from the centre of the straight portion of one side to the centre of the straight portion of the other side is 30 feet.

Drawing referred to offered in evidence, marked "Defendants' Exhibit Newton No. 3."

128 X Q. 85. Look at the drawing now shown you, and state if that would not substantially represent the dam described in exhibit Newton No. 2, provided it was the intention of the constructor to support the machine upon a float, such as that described in exhibit last shown you, (defendants' exhibit Newton No. 3,) and to produce the result described in exhibit Newton No. 2, as that which the machine there described is intended to accomplish.

A. I understand that I am to assume two things, which appear to me to be incompatible, viz: First, that the drawing represents what is described in exhibit Newton No. 2, and second, that the float is to be such an one as either of the two represented in defendants' exhibit Newton No. 3, and therefore I cannot answer the question under those two assumptions. I can answer the question, assuming that it amounts to this, viz, that if either of the floats represented in defendants' exhibit Newton No. 3 were to have curtains of iron extending, &c., as described in lines 7 to 14, inclusive, of page 8 of Newton Exhibit No. 2, the structure produced would be such as is represented by the drawing now shown me, and will state my opinion if requested.

Drawing referred to in last answer offered in evidence, and marked "Defendants' Exhibit Newton No. 4."

(Complainants' counsel objects to the introduction in evidence of defendants' exhibits Newton No. 3 and No. 4, and to the introduction of the following words on No. 4: "Current-breaker, as described in Gen. J. Newton's letter of January 21st, 1867, to Gen. A. A. Humphrey, Chief Engineer, U. S. A., and published by authority of U. S. Congress.

"NOTE.

"D, D, D, posts to attach falls to, after the curtains or sections of the 'current-breaker or dam' are in proper position, and in case a derrick or davit is used to hoist or lower more than one section of the
129 curtain;" and to the introduction of the following words on Newton No. 3: "Figs. I and II. Each showing in plan two cylindrical floats, 30 feet from centre to centre, towards their extremities, inclined towards each other until they meet, forming one float 160 feet long and 40 feet wide.")

Re-d. Q. 86. Are there any other reasons why you do not regard exhibits Newton Nos. 3 and 4 as correct representations of the matter described in exhibit Newton No. 2? If so, set forth the same in your answer.

A. There are, viz: because the use of the contrivance represented by Newton Exhibit No. 4, and the use of either of the floats represented on Newton Exhibit No. 3, is incompatible with the description upon the lower part of page 7 of Newton Exhibit No. 2, in reference to the platform and its appurtenances for conducting the drilling operations.

Thus, at the commencement of page 8, the word "likewise" is used in reference to the apparatus thereafter described, thus conveying to my mind the idea that the subsequently described apparatus is to be used together with and in addition to the mechanism for drilling described upon the previous page. Now, that previous description describes that the platform for the drilling apparatus is to be floated to its position, supported on the decks of two scows or other floats, which are to be floated away when the water falls. The annular floats represented in defendants' exhibits Nos. 3 and 4 are continuous, flattened rings without joints, without any means of opening them, and without any means of connecting and disconnecting their parts, if they were made in parts; and, further, the deck of the apparatus represented in exhibit Newton No. 4 is represented as a rigid structure without any opening, and without any appliances of any description for holding its parts together, if it were made in parts; the absence of any means for connecting and disconnecting sections or parts in exhibits Newton Nos. 3 and 4 being evidence to my mind that the floats and the deck represented in those exhibits are continuous, rigid structures, not made in removable
130 parts. With such structures it would be impracticable to remove the scows for placing the drilling platform by floating them away, when the platform was surrounded by a float such as is represented by either one of the figures of Newton Exhibits 3 and 4, as the scows could not be floated out of the hollow space within the annular float. Whereas, if two cylindrical floats, inclined towards each other towards their extremities until they meet, so as to form a float in the form of a V, were used, there would be no difficulty whatever in floating off the scows at the open butt of the V, or of backing up the V float over or in front of the platform after the platform had been located and the scows floated off.

There is an additional reason why the float represented by Fig 2 (as-

suming its sides to have circular cross-sections) could not be the one described or intended to be described on page 8 of Newton Exhibit 2, namely: that the horizontal curvature of its ends is incompatible with the use of flexible curtains of iron, as described on page 8; thus the statement on said page is, in substance, that the said curtains extend along the whole outer line of the float; and, therefore, if the curved ended float represented by figure 2 of Newton Exhibit No. 3 were the one to be used, the curtains would extend along the curved portions at the ends as well as the straight portions intervening between the curves. The curtains would thus have to be curved horizontally to suit the curvature of the lines of the floats, and such horizontal curvature is incompatible with the vertical flexibility of the curtain required by the paragraph composed of lines 13 and 14 of page 8, and with the action of the curtains as described in the paragraph composed of lines 15, 16, and 17 in Newton Exhibit No. 2, page 8.

Re-X Q. 87. Would it be impossible to attach straight curtains to the curved sides of figure No. 2, by using appliances projecting from the sides of figure No. 2 for attaching straight curtains?

(Objected to as assuming what is not stated in the reference, Exhibit No. 2.)

131 A. It would not be impossible to attach curtains which are straight vertically to the curved sides of Exhibit No. 2, if the curtains were rigid, because then vertical flexibility would not be required. But I think it would be impossible to attach curtains which were straight horizontally to the curved sides of figure No. 2, by using appliances projecting from the sides, because the use of such appliances, of necessity, excludes the idea of the attachment of the curtain itself to the curved sides, and substitutes, in place of such attachment, the attachment of the curtain to the projecting appliances. Again, it would be impracticable to attach a curtain which was straight horizontally to the curved lines of figure 2, and have the curtain extend, as stated in the Newton Exhibit No. 2, along the outer line of the float, because a straight line must of necessity diverge from a curved line, and not extend along it.

E. S. RENWICK.

WILLIAM C. HICKS, a witness of lawful age, produced on the part of complainants, having been first duly cautioned and sworn to testify the truth, the whole truth, and nothing but the truth, in the matter of controversy herein, and being examined by Mr. How, of counsel for complainants, deposes and says as follows:

Q. 1. What is your name, age, residence, and occupation?

A. My name is William C. Hicks. I am 43 years of age. I reside at Summit, N. J. I am a consulting engineer. My business is principally that of soliciting patents and acting as expert in patent causes.

Q. 2. What familiarity and acquaintance have you had with mechanical subjects and with letters-patent for inventions?

A. For the last twenty-four years I have been engaged in engineering pursuits, including mechanical constructions and superintending public works, and during that time I have had a continued acquaintance with patented inventions and with patents.

132 Q. 3. What knowledge have you, and what experience have you had in anchoring scows or other boats or vessels in tide-ways and currents?

A. I have had some experience in mooring and anchoring scows for driving piles and dredging, and also some experience in reference to the

(Complainants' counsel objects to the introduction in evidence of defendants' exhibits Newton No. 3 and No. 4, and to the introduction of the following words on No. 4: "Current-breaker, as described in Gen. J. Newton's letter of January 21st, 1867, to Gen. A. A. Humphrey, Chief Engineer, U. S. A., and published by authority of U. S. Congress.

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Q. 2. What familiarity and acquaintance have you had with mechanical subjects and with letters-patent for inventions?

A. For the last twenty-four years I have been engaged in engineering pursuits, including mechanical constructions and superintending public works, and during that time I have had a continued acquaintance with patented inventions and with patents.

132 Q. 3. What knowledge have you, and what experience have you had in anchoring scows or other boats or vessels in tide-ways and currents?

A. I have had some experience in mooring and anchoring scows for driving piles and dredging, and also some experience in reference to the

mooring of vessels in tide-ways, of which I may mention the engineering operations under my charge in the city of Hartford, near the Colt Dyke, and also in Hell Gate, or near Hell Gate, on the schooner which was used for the operations of raising the old frigate Hussar, in reference to which work I have been consulted for the last fourteen years.

Q. 4. State the result of such knowledge and experience in regard to the practicability of anchoring such scows, boats, or vessels in such tide-ways and currents, with sufficient stability for practical operations in which precision is required in the work.

(Objected to—firstly, as the witness has not been shown to be an expert in or have any acquaintance with the operations of subaqueous drilling, or of the requirements or necessities of such work; secondly, that the question is too indefinite, as not specifying the class, size, dimensions, or intended use of the vessels inquired of; and thirdly, that it does not specify the kind of work for which precision is required.)

A. As for as my experience extends, I have met with no insurmountable difficulties in attempting to hold scows in position accurately enough to drive piles thirty feet in length in a straight line, and at other times to hold the boat within such practicable limits as would enable any work to be done which might be desirable, when proper care and attention was paid to the mooring chains or anchor connections. Of course, these appliances require constant attention where there is a rise of the tide or the shifting of currents from one point to another, but these arrangements all lie within such limits that they can be adapted, without serious difficulty, to the exigencies of the particular case desired.

Q. 9. Have you examined the letters-patent of the United
133 States, No. 80492, granted to Wm. H. Cammeyer July 28th, 1868, for an improved portable and adjustable still-water dam, which patent is marked "Complainants' Exhibit A" in this cause, and do you understand the construction therein described, and the invention therein set forth and specified as the invention of Samuel Lewis?

A. I have examined the patent referred to in the question, and I think I do understand the invention therein set forth and claimed as the invention of said Lewis, and I also understand the construction therein described.

Q. 6. State whether or not, in your opinion, the apparatus described in the said letters-patent would be practically useful for the purpose stated in said patent, and give your reasons for any opinion you may express in that regard.

(Objected to, as the witness has not been shown to be qualified to testify in this respect, either as having been engaged in submarine drilling operations or acquainted with the construction or use of machines for such operations.)

A. I think it would, and my reasons are as follows: 1st. It is necessary, in order to operate upon rocks lying in the bed of a stream, where the current is excessive, to protect the divers and also the buckets for removing the material, and also the other implements and apparatus used for loosening such material, and in the case of drills used for penetrating the rock to cover up the frame and other guides through which the drills may operate, so that the strength of the current may be deflected from them. 2dly. It is necessary that an apparatus suited for drilling or removing rock should have the capacity for portability, in order that after the drilling has been performed, and the charges inserted, the whole apparatus may be removed and the charges fired; and again, this portability is necessary in order to enable those operating it to bring back the apparatus to the position it formerly held and to remove the rock loosened by

134 the explosion. 3dly. It is necessary, in order that such an apparatus should be successful, that the supports or floats with which it is combined may be moved from place to place without causing the lower portion of the dam to strike against the bottom of the river or tide-way, when caused to pass in shallower water over obstructions. In order to do this the dam should be adjustable vertically, or, in other words, so constructed that the bottom of its lowest portion may be drawn up at times near to the float, and at other times be capable of being lowered to the bottom of the river or tide-way. 4thly. A dam, in order to be successful for the purposes set forth in the patent referred to, must have such means for holding the drills in position, so that they may be operated from above the surface of the water, and must also be provided with means for adjusting its anchor or holding chains, so that variations in the flow or rise of the tide may be provided for. I find all these appliances and contrivances described in the patent referred to, and therefore, for the reasons which I have stated, I believe it to be a practical and serviceable machine.

Q. 7. State whether, in your opinion, the said apparatus, constructed as described in the said patent, and when operated as therein described, will be sufficiently stable in a tide-way or current, for the practical operations mentioned in the patent, and give your reasons for any opinion you may express in that regard.

A. I have no doubt that it would be practicable and sufficiently stable for all the purposes of drilling and removing the rock. My reasons are as follows: There is no limit placed to the number of anchors or chains set forth in the patent for the purpose of holding the boat or float or dam in position, and, together with the self-anchors, weight of the parts, and the formation of the dam, they are entirely sufficient to maintain the boat and drilling apparatus within such limits as would enable the persons operating the drills to operate them with sufficient accuracy for practical purposes. The weight of the upper sections of the telescopic portion of the dam would necessarily cause them to hang vertically, and to be extended to their extreme limit. This would cause the whole move-
135 ment of adjustability between the bottom of the dam and the boat to take place in the lower section, and I have no doubt that the boat or float might move on the surface of the water at least one foot in any direction, without seriously affecting the drills or the position of the lower section of the dam.

Adjourned to Wednesday, June 11th, at 11 a. m.

WEDNESDAY, *June 11th*, 1873—11 a. m.

Counsel present as before.

Examination adjourned until new notice.

NEW YORK, 25TH *September*, 1873.

Present: Mr. How, counsel for complainants, and Mr. Keller, counsel for defendants.

Examination of witness Hicks continued:

Q. 8. Examine the model now shown you, marked "Exhibit D" in this cause; state whether or not you find in said model the subject-matter of the first claim of the said letters-patent, and give your reason for any opinion you may express in that regard.

(Objected to, as the question calls for opinion on the question of infringement, which belongs to the opening case of the plaintiffs, and is not in rebuttal of the defendants' case.

A. I have examined said Exhibit D, and I do find in it embodied

substantially the subject-matter set forth in said first claim, and my reasons are as follows: I find in the combination of mechanism, shown in Exhibit D, a telescopic enclosure, portable and adjustable for the purpose of protecting divers and drillers in the process of setting the apparatus, drilling the holes in the rocks, and guiding the drills,
136 and also for the purpose of enabling the workmen to remove the obstructions and the parts of rock loosened by the blasting. I find, also, in combination with this telescopic enclosure, a boat or float-supporting apparatus for raising and lowering the telescopic enclosure, and also for drilling the rock, which are arranged to operate in connection with said enclosure, substantially in the manner and for the purposes set forth and described in the specification. The telescopic enclosure or dam to which I refer is the metallic dome resting below the boat or float, provided with a cylindrical metallic slide, fitted to an opening in the top of said dome, and capable of being raised or lowered at will, so that the plane of its upper end may be adjusted to different heights in reference to the bottom of the dome or the rock upon which it rests, said dome having attachments by which it may be connected to chains, or their equivalents, reaching from the windlasses on the boat or float, so that, at the proper times, the whole telescopic enclosure, including the cylindrical portion referred to, may be raised or lowered, in reference to the boat or float, into the well-hole of said boat or float, so that said telescopic portion may be shut up or slid into the well-hole of the boat to enable it to be readily transported over shallow portions of the stream, and to afford an adjustable apparatus, so that the operators may be protected between the deck of the boat and the bottom of the river, and enabling the whole apparatus, although furnishing that continued protection to the workmen from the current striking against any portion of the enclosure or the boat, still capable of rising and falling with the tide, and forming, in that respect, an adjustable dam.

Q. 9. State whether or not you find in the said model, Exhibit D, the subject-matter of the second claim of the said letters-patent, and state your reason for any opinion you may express in that regard.

(Same objection as to the last preceding question; and, in addition, that the question calls for an opinion on a matter of law, the construction of the claim being purely a matter of law, and not of fact.)

137 A. I find in said model, Exhibit D, self-anchors combined with the dome, substantially in the same manner and for the same purposes as set forth in the specification; and, in addition to the arrangement of said anchors with the dam set forth in the specification, I find in Exhibit D that said anchors are arranged with self-acting sets to hold said anchors firmly in position, and also that said anchors are located inside the enclosure; whereas in the patent they are represented as being outside of the dam. But I do not consider these changes material nor effecting a substantial difference in the operation of said anchors for the purposes set forth in the specification.

Q. 10. State whether or not you find in the said model, Exhibit D, the subject-matter of the third claim of the said letters-patent, and give your reasons for any opinion you may express in that regard.

(Same objection as to question No. 9.)

A. I do find in said Exhibit D substantially the same mechanism, combined substantially as described in the specification, and arranged to operate substantially in the manner and for the purposes set forth in the specification, for the reason that I find a dam, or dome, or enclosure, for the purpose of protecting the workmen and the drills, combined with a boat furnished with a well-hole in its centre, operating in the place of

the two boats set forth in the specification, and the well-hole acting in connection with said boat, so that the dam, in connection with rising and falling of the well-hole, affords a continuous adjustable apparatus for protecting the workman, so that they may carry on the operations of drilling and removing the broken rock after blasting entirely protected from the currents and substances floating upon the water; and also portable, so that the apparatus may be shortened and removed for the purpose of blasting, and then returned to its former position. And I find also the anchors for holding the scow in position arranged substantially in the manner and for the purposes set forth in the specifications.

138 Q. 11. State whether or not you find in the said model, Exhibit D, the subject-matter of the fourth claim of the said letters-patent, and give your reasons for any opinion you may express in that regard.

(Same objection as to question No. 9.)

A. I do find the combination and arrangement of windlasses, chains, and boats with the dam substantially as described in the specification, so that a series of drills may be operated within and enclosed by the dam substantially in the manner and for the purposes set forth in the specification, for the following reason: I find upon the deck of the scow, provided with a well-hole in its centre, which is directly over the dome and the cylindrical tube which is adapted to it, windlasses and chains placed in such position over said dome, and also over said cylinder, that chain attachments may be made to eyes or rings upon either the cylinder or the dome, by which either the cylinder or the dome may be raised or lowered, and the dome, with its cylinder, sheathed in said well-hole, so that the apparatus may be moved over shallow portions of the stream and located at will over rocks to be operated upon. And I find also drilling-apparatus attached to frames over said well-hole and cylindrical portion of the dam, so that a series of drills may be operated within said enclosure and guided by suitable pipes, by which the motions of the drills and their positions in reference to the rock may be regulated and adapted. Some of these pipes are in the dome proper, and some are in the cylindrical or sliding portion of the dome or enclosure, but they operate to direct the drills and to protect the chain or rope connection by which they are driven from being deflected by the currents of water or obstructed by other means, thus enabling the drillers to operate between the deck of the boat and the rock at any and all times, and while the tide is rising and falling. The windlasses are not connected in the model by chains with either the cylinder or the dome, but they may be thus connected, and rings or staples are provided on both of them in such position as to leave no doubt in my mind that they are used for the purposes indicated by me.

139 Q. 12. State particularly what you understand by the words "sliding or telescopic sections" in the first claim of the complainants' letters-patent, and what results are derived therefrom in the apparatus described in the said letters-patent.

(Same objection as to question No. 9.)

A. I understand by the words "sliding or telescopic sections" that such sections are capable of being slid over one another, so that the apparatus may be elongated or shortened, extended or sheathed, so that in case they stand vertically they would form a continuous obstruction to anything moving in lines horizontal or at right angles to said vertical lines. The advantages to be gained by this capacity for lengthening or shortening in the case of a dam are, that it enables an enclosure to be

adapted to the depth of the bottom of the river, between the deck of the vessel and the said bottom, both for the protection of the workmen, the drilling-apparatus, the hoisting-apparatus, the air-pipes and pumping-apparatus, in connection with the divers' equipments, which latter is a very important feature; and also for giving capacity to the apparatus for condensation to pass over shallow portions of a stream; and also to be able to operate upon, with practical efficiency, rocks lying at different depths from the surface of the water. It is very important that the line of the surface of the water should be perfectly guarded against floating objects, and to protect the workmen in entering the cylinder of the dam or enclosure; for otherwise the force of the current would drive them forcibly against one side of the top of the enclosure, render the rubber tubes, by which air is pumped to the divers, liable to be entirely cut off or injured, and, in case of raising a bucket containing rock from the enclosure, rendering it dangerous, where the current is excessive, both to the workmen and to the apparatus.

Q. 13. What can you say as to whether or not you find such sliding or telescopic sections in the dam shown in Exhibit D, and explain your answer fully.

(Same objection as to question 8.)

140 A. I do find a telescopic section in the enclosure shown in Exhibit D—I refer to the cylinder before described—arranged in the top of the dome, so that it may be pushed in even with the top of the dome nearly, and raised up or extended nearly the entire length of the cylinder. I have considered the fact that said cylinder is provided with apparatus to hold it at certain portions of its length, so that in order to shorten the enclosure thus far described it would be necessary to disengage the holding-apparatus; but this, in my opinion, does not any the less render it a telescopic joint; but I consider that in addition to this telescopic enclosure, that the upper section formed by the sides of the well-hole in the boat, surrounding and protecting said cylinder, or from another substantially telescopic section as far as this invention is concerned, for it affords the same protection, practically, to the divers and their apparatus, and is capable of rising and falling in reference to the dome and cylinder; receiving said dome and cylinder when the apparatus is drawn into the short quarters, and operates substantially to the same end as the upper section shown in the patent, attached to the edges of the well-hole there shown and described.

Q. 14. Have you made or witnessed any experiments tending to show what the effect of a horizontal current would be running against the side of a dome or dam of the form of the lower section of the enclosure for the drills in Exhibit D? and, if so, state the nature of those experiments and the results.

A. I have. About the middle of May, in the present year, I made a dome-shaped apparatus, having a flange projecting upwards, similar to the dome shown in Exhibit D, and went with it to the dam of the Passaic River, at Summit, for the purpose of making experiments as to the effect of a current of water upon said apparatus. Having satisfied myself as to the action of the water in a current upon such structure, I ordered a dome and telescopic cylinder provided with points or legs, representing, as near as I could, the anchors used with the dome in Exhibit D, the other parts of the apparatus shaped and proportioned, as near as I could have it constructed, like the dome in Exhibit

141 D. I then experimented in the same river, placing the apparatus in a current running, as near as I could measure, about four miles an hour. The apparatus was placed on said anchors above a rough-

surface block, corresponding to the irregularities which might be found on the surface of rock under water. I then lowered the apparatus vertically into the current several times, and each time varying the position, so that the current struck all sides of the dome during the different immersions. I found that the dome, cylinder and all, was invariably tipped over, using the points of the anchors most distant from me as fulcrums to turn upon, the top of the apparatus moving down the stream. These experiments I tried with the top of the cylinder even with the top of the flange of the dome, about half way up, and also at the extreme length, and invariably with the same result, namely, the current turned the apparatus completely over. I tried these experiments again, in connection with Mr. Edward S. Renwick, the latter part of May, if I correctly recollect, with the same results, and about the same current, and with the apparatus, as far as I can now see, exactly as it is in Exhibit K.

Q. 15. What can you say as to whether or not the clamping of the vertical bars, attached to the bottom of the inclosure for the drills, in Exhibit D, at all impairs their action as self-anchors, as described in the said letters-patent, for securing the dam against lateral pressure?

(Same objection as to question No. 8.)

A. I understand the use and object of the self-anchors to be, first, that they are capable of adapting themselves to the irregularities of the surface of the rock, and for that purpose they are made so as to slide up and down, over a considerable distance, and then, having been adjusted to the irregularities of the rocks, I understand they are for the purpose of preventing the lower section of the dam from being displaced in a horizontal direction; adding to said anchors a means for clamping them adds to their efficiency, without, however, changing their action
142 in reference to keeping the lower section from moving horizontally.

Q. 16. Examine Exhibit D particularly, and state whether or not it is practicable to raise or suspend the cylindrical section of the dam upon the chains attached to the ends of the cranes when the bridges are down, the drilling engines in position, and the machine in operation.

(Same objection as to question No. 8.)

A. The chains connected with the cranes at present upon the model do not appear to be long enough to reach the rings upon the dome or cylinder, but there would be no practical difficulty in raising or suspending the cylindrical section of the dam, by attaching proper drag-chains for the purpose. It would be necessary, when the bridges are down, to connect the chains to two eyes and draw upon them at points left open by the bridges.

Q. 17. Examine defendants' exhibit Foster No. 1, and defendants' exhibit Foster No. 2, and state whether or not you find in said exhibits, or either of them, the subject-matter of any of the claims of the letters-patent, complainants' Exhibit A, and give your reasons for any opinion you may express in that regard.

A. I do not find in either of these exhibits, Foster No. 1, and Foster No. 2, the combination of mechanism set forth in the claims of said patent, or any of them. I do find in said exhibit Foster No. 1, a skeleton frame, the four legs of which are represented as resting upon an irregular foundation, having two parallel horizontal tables supported by said legs, between which tables is placed an apparatus for operating a drill, working vertically through said tables near their centres, and reaching down to the rock or bed upon which the legs stand. Through an eye in the upper table a chain is passed downwards, and is attached

to a forked lever, which seizes the drill, when the chain is drawn upwards by means of a hole encircling the drill, and caused to engage with the circumference of the drill when the chain is drawn upwards by the bight of the circumference of said hole against the sides of
143 the drill. The forked edge of this lever travels on an incline guide, so that when the chain is drawn upwards, and with it the drill and forked lever, both are caused to revolve until the forked lever strikes a stop on the incline, when the combined movement of the chain upwards, or the slacking of the chain downwards, allows the weight of the drill to fall and to penetrate the rock. In exhibit Foster No. 2 there seems to be represented the same apparatus, connected by a chain to machinery of some kind upon a boat, not distinctly shown, and a diver apparently standing by said apparatus under the water, with air-pipes connecting him with apparatus upon the boat. This machinery for holding the drills apparently has means for adjusting the lengths of its legs, as I see set-screws and an apparent enlargement of the lower portion of the legs; I judge that the joint is telescopic, and intended to be held firmly by the set-screws when placed in position. As there is no enclosure whatever shown in either of these exhibits, Foster No. 1 and Foster No. 2, and as I understand that a protecting enclosure is the basis of this patent, and made the subject-matter of the first claim, and one of the elements in the combination of all the other claims, I do not find in these exhibits, Foster No. 1 and Foster No. 2, the subject-matter of any of said claims.

Q. 18. Examine defendants' exhibit Newton No. 2, and state whether or not you find described in said exhibit the subject-matter of any of the claims of the said letters-patent, complainants' Exhibit A, and give your reasons for any opinion you may express in that regard.

A. I have examined a portion of exhibit Newton No. 2, especially that portion at bottom of page 7 and the top of page 8, and I do not find set forth in the said description, mechanism, or combination of mechanism, set forth in the claims of said patent, or either of them. I find described here a platform, having legs for supporting it upon the bottom of the river, with a recommendation that hollow iron cylinders may be used reaching from said platform to the rock through
144 which drills may be made to work, and by which the interference of the currents with the drills may be prevented. I do not see any indication as to whether this platform is to be removed during a blast, but there is a description of a method which is recommended to remove the rock blasted. The said apparatus is described as follows: "Two cylindrical floats of sufficient buoyancy, made of boiler-iron, are placed, say thirty feet from centre to centre. Towards their extremities they are inclined towards each other until they meet, forming one float, say 160 feet long and 40 feet wide." Curtains of iron are to be placed on the outer line of these floats, about twenty feet in length, made of plates of iron about one foot wide, connected by hinge-joints, so that they may be flexible. They extend down to the rock, and several plates are allowed to rest upon the rock. It is thus stated that a space 160 feet by 40 on the bottom would be protected; whether this float is open at one end and closed at the other, or whether the platform with which the drills are connected and operated is left standing, and the floats brought round it, or whether it is removed and the float takes its place when the blasted rock is to be removed, I am not able to say; but if the platform be left standing, then this float could not be placed over the rock except it were open at one end, or capable of being separated into half for that purpose. If the platform with the drills is to

be removed, and the float is closed at both ends, then the apparatus is simply a float with curtains for the purpose of removing rock which has been blasted, and has no connection with drilling operations whatever. Again, the floats with the curtains would not make a protecting enclosure which would prevent the currents of water from sweeping through, nor would it be, in any respect, in my opinion, an equivalent for a telescopic dam. And as far as the description goes, as I find no combinations of any enclosure with drilling apparatus or the other parts with which the dam is combined, as set forth in the specification, I do not find the combination of mechanism set forth in the claims of the patent in said Newton Exhibit No. 2.

Adjourned until Friday, 26th September, 1873, at 11 a. m.

145 NEW YORK, *September* 26, 1873—11 a. m.

Present: Counsel for the respective parties, as before—Mr. How and Mr. Keller.

And the said witness HICKS, being cross-examined by Mr. Keller, deposes and says:

X Q. 19. Do you find described or represented in the plaintiffs' patent any other than the telescopic dam represented in model, complainants' exhibit E?

A. Under the understanding that the model, Exhibit E, is made in exact accordance with the drawings of the patent, there is no other dam set forth in the description in detail other than such as referred to, but on the first section of specification of the patent, and the subsequent sections down to the section beginning with the words, "Fig. 1," the description is general, and refers to a new and improved portable and adjustable dam for the purpose of producing still water in which to operate for blasting and removal of obstructions in rivers and other water-courses, and the necessity and advantage of such a dam are set forth.

X Q. 20. Did you understand my question as calling for an argument as to the intention of the patentee, as manifested in the description, or simply to state whether the patent described any other telescopic dam than the one represented in the model, Exhibit E?

A. I did not understand the question as calling for an argument, and I answered it as I understand the description in the patent in reference to the dam referred to in the question.

X Q. 21. In the telescopic dam described and represented in the patent is not the upper section attached permanently to the platform or frame-work which connects the two floats?

A. Not permanently, but by chains which, when attached to the frame-work and to the upper section of the dam, have no means of adjustment shown, but still allowing the upper section to have motion in reference to the frame-work.

146 X Q. 22. By what figure of reference on the drawing are the parts represented which form the connection between the upper section of the dam and the platform which connects the two floats?

A. Figures 16 and 17 I understand to represent the connection referred to in the specification, on page 2, 38th line and 39th line, in the following words: "The telescopic apparatus thus prepared is then suspended from the deck by the four links and bolts, 16 and 17; the several chains are then drawn through their respective openings and attached to their proper windlasses, and then, as far as regards this application, the dam is ready for work."

X Q. 23. Does that part of the quotation from the specification, in

your last answer, beginning with the words "the several chains," relate to the connections of the upper section of the dam with the platform?

A. I understand they do not, but that the words "four links and bolts" refer to this connection, and as there are two links in each connection, they form the chain to which I refer.

X Q. 24. You mean, by your last answer, that the links and bolts 16 and 17 constitute the chains referred to in the latter part of your quotation from the specification?

A. I do not so understand it. I understand that Fig. 16 and 17 form the chains to which I referred in my former answer as connecting the upper section with the frame-work.

X Q. 25. When in operation, is not the upper section of the telescopic dam, in complainants' patent, always suspended from the platform?

A. I understand that it is so intended to be.

X Q. 26. Is not the suspension of the upper section of the dam, in the plaintiffs' patent, the only mode of construction and arrangement of that part of the portable or adjustable dam which is described or represented in the patent?

A. It is.

X Q. 27. Is there any such construction and arrangement and connection of the upper or any section of the dam in Exhibit D, with reference to the platform or float, when in operation?

147 A. I think there is substantially the same construction and arrangement, by which I mean the well-hole of the boats, which operate in reference to the lower sections as such upper sections of the dam.

X Q. 28. When in operation is there any portion—any part of what you have termed in your testimony the cylinder in Exhibit D—which is in any manner or by any means in connection with the float? and, if so, point out such connection.

A. I have never seen the machine in operation, but I understand that said upper section or cylinder is not connected with the float, but that it is set, in reference to the dome, at some fixed position, and, so far as the apparatus is concerned, as a whole, I called the dome and the cylinder the lower sections of the dam, relatively to the upper section, formed by the well-hole, although the dome, with its cylinder, constitutes, in my opinion, alone, a telescopic dam.

X Q. 29. Is there any connection between the cylinder or the dome and the well-hole of the float in Exhibit D? If there is, point it out in the model.

A. There is, most decidedly, a connection between the telescopic dome and cylinder, by means of the drilling apparatus, but that connection would be through, in one instance, the pipes in the dome and chain, and in reference to the cylindrical part, through other similar pipes, the drills passing through these pipes, and being operated by chains connected with the drilling-machines on the bridges of the deck; but if such connections referred to in the question mean whether the well-hole is directly attached to the upper cylinder, and suspended from the deck during the operations of drilling and removing rock, I do not understand that it is intended to be so used, but I can imagine positions and shapes of the bottom which would absolutely require the lower dome to be suspended from chains from the deck.

X Q. 30. Did you understand my question as calling upon you for the exercise of your imagination?

A. I understand that it is impossible to compare the operations of two

machines when in actual use, looking at models of them, without the exercise of imagination.

148 X Q. 31. Can the telescopic dam, described in plaintiffs' patent, when constructed and arranged as therein described, in its relation to the float, be operated practically, unless the upper section be suspended from or attached to the platform which connects the floats? and the witness's attention is specially called to the use of the words in the question, "constructed and arranged as described in the patent."

A. I think they cannot.

X Q. 31. Can self-anchors, such as described in plaintiffs' patent, be used with the apparatus represented by Exhibit D, for the purpose of leveling the dome?

(Objected to as immaterial and irrelevant.)

A. I think not, to level the dome, without additional machinery; but I think that the self-anchors, without any clamp, when placed upon some irregular formations of rocks, would bind sufficiently, and have sufficient friction in their way, to support a large portion of the lower section, if not the whole of it; but I do not understand that they are designed in the patent to sustain the lower section in a vertical direction. But, however, in the model referred to on this cross-examination as being the model correctly representing the drawing of the patent, there is a set-screw, or a hole for one, represented, for the purpose, as far as I am able to observe, of holding said self-anchors in any desired vertical position.

X Q. 32. Is there any description in the specification, or any representation in the drawings of the plaintiffs' patent, of any such set-screw, or hole for a set-screw, as referred to in your last answer?

A. None that I have been able to discover.

X Q 33. Looking at the extent of open space between the inner surface of the well-hole of the float of Exhibit D and the outer circumference of the cylinder, is it your opinion that the water would be still in a strong current within that space?

A. In that part of the well-hole which would project down below the top of the cylinder, the current would be much greater than at

149 the surface of the water; I should judge that the surface of the water would be sufficiently quiet to use the term still, when compared with the outside current. But if absolutely still and at rest is meant in the question, I should say it would decidedly not be still, but it would form such a protection to the upper part of the cylinder that no floating bodies could obstruct the operations of the workmen, and the motion of the water would necessarily be that of boiling, rather than a current, and, in my opinion, there would be no perceptible current near the surface of the water. However, this motion of the water would be entirely in proportion to the distance at which the top of the cylinder was placed or set in reference to the bottom of the well-hole. The top of the cylinder in shallow water could be very readily placed entirely above the surface of the water, and then any current or boiling between the two would be of no consequence whatever.

X Q. 34. Taking in view the currents at and around Hell Gate, where do you suppose the water would be not agitated—outside of the boat, or on the well-hole around the cylinder?

A. If by the word "agitated" is meant rapid motion in one direction, or such as would be by flowing current, I should say that the greatest agitation would be outside of the boat. But if by agitation is meant such a motion as boiling, I should say the greatest agitation would be inside of the well-hole; and here I am somewhat guided by the testi-

mony which I have heard in this case, where it has been stated that such boiling did take place even inside of the dome.

X Q. 35. What object did you have in making the experiment with Exhibit K and L?

A. To demonstrate the fallacy of the position that the aggregate tendency of the pressure of the water was to keep the dome down.

X Q. 36. In the experiments that you made with that exhibit, was it placed on the bottom of the stream, or suspended above the surface within some distance from the bottom?

A. The bottom of the board which holds the irregular surface
150 in Exhibit I was immersed nearly to the bottom of the stream, until it rested upon a stone on the bottom of the stream, and the top of the cylindrical part, in all cases, below the surface of the water.

X Q. 37. At what depth of water was this experiment made?

A. When my first experiment was made I should say the depth was about eighteen inches; but on the second experiment the water had fallen, and I should judge it was not much more than a foot. I did not measure, however, the depth of the water, except by the appearance of the water-mark on the scantling by which I immersed it.

X Q. 38. What means did you employ for ascertaining the formation of the bottom, where you tried this experiment?

A. No means whatever. I did not care what the bottom was, as I made an artificial bottom for the purposes of the dome.

X Q. 39. Did you conclude, from that experiment, that a strong current of water at a considerable depth, say from fifteen to twenty feet below the surface, with a dome so heavy that the force of the current, striking the curved surface of the dome, and of the cylinder projecting above it, was not sufficient to upset the fixture—that such current passing over the curved surface of the dam would not tend to hold it down?

A. In the first place, I could not conclude that the depth of water had anything to do with it, and did not so conclude, as my experiment was for the purpose of demonstrating that the weight did hold it down, and that the tendency of the current against the dome was far greater to turn it over than to keep it down; that, therefore, the assumption that the current held down the dome and not the weight, was erroneous, and therefore I did not conclude, from the experiment, what is stated in the question, but I did conclude that, although there was a slight pressure in a current to keep the dome down, it was very much more than counterbalanced by the tendency to tip it over.

X Q. 40. Which would be more readily tipped over by a cur-
151 rent, a cylindrical form or the dome form represented by Exhibit D, the cylinder being of equal diameter with the diameter of the base of the dome?

A. If the heights of the two structures were the same, the cylindrical form would have the greatest tendency to turn over in a current.

WM. C. HICKS.

Subscribed and sworn to before me this 26th day of September, 1873.

JOSEPH GUTMAN, JR.,
Examiner, &c.

Adjourned to September 29, 1873, at 11 a. m.

N. Y., *Sept.* 29, 1873—11 a. m.

Present: Counsel for respective parties, as before.
Testimony closed.

152 United States circuit court, southern district of New York.

WILLIAM H. CAMMEYER AND SAMUEL LEWIS
against
JOHN NEWTON ET ALS. } In equity.

Deposition of witnesses produced, sworn, and examined on the part of the respondent, under and pursuant to the 67th rule in equity, as amended, before G. Irvine Whitehead, a special examiner appointed to take testimony in this cause, as appears by the certified copy of the order of court, hereto annexed.

NEW YORK, *January* 30, 1873—11 o'clock a. m.

Present: Thomas P. How, esq., of counsel for complainant, and Henry E. Davies, jr., esq., of counsel for respondent.

It is admitted that the respondent, John Newton, received the letter, of which a copy is marked "Complainants' Exhibit I," on the 30th of June, 1872.

HORACE F. RODMAN, a witness called on behalf of the respondent, being called and duly sworn, to interrogatories propounded by Henry E. Davies, jr., esq., deposes as follows:

Q. 1. What is your name, age, residence, and occupation?

153 A. Horace F. Rodman. I am 27 years and 11 months old; I reside at 215 Lewis street, in the city of New York; I am a machinist and engineer.

Q. 2. Have you been employed in and about the apparatus represented in Exhibit D; and, if so, when did that employment begin, for how long has it been continued, and in what capacity were you employed?

A. I have. I commenced the 13th of August, 1870, and am still employed on it as engineer.

Q. 3. Have you worked continuously on the machine during the period you have stated?

A. I have.

Q. 4. Are you acquainted with all the work that has been done by it and with its operation during that time?

A. I can't say as I am fully acquainted with all the work.

Q. 5. Are you familiar with the mode of operation of the machine? Have you seen it operated?

A. I am, and have.

Q. 6. By whom was the machine directed, controlled, and managed?

A. Firstly by General John Newton, and then Superintendents Pierce and Eccleston.

Q. 7. State when and where the machine was first worked.

A. In the fall of 1870, on Diamond Reef.

Q. 8. For how long a time, during the fall of 1870, was it worked on Diamond Reef?

A. Between two and three months.

Q. 9. What was done with it after that period of working?

154 A. It was laid up for the winter season for making improvements and repairs.

Q. 10. State what was done with it after such laying up, and when, where, and for how long it was next worked.

A. It was taken to Diamond Reef and then to Coenties Reef, and worked all that season of 1871 on those reefs.

Q. 11. State when and where it was next put in operation, and how long such operation continued.

A. It was put in drilling operation on Diamond Reef, and then taken to Frying Pan Reef, then to Pot Rock, where it worked all the season of 1872. It worked on all three reefs during the season of 1872.

Q. 12. During your connection with the machine have you ever seen any adjustment or movement of the upper section of the dam or dome represented in Exhibit D, and if so how many times have you seen such movement or adjustment, and when did it take place?

A. Once, in the spring of 1871.

Q. 13. Has it ever, to your knowledge, been moved or adjusted at any other time than the one you have spoken of?

A. Only to be repaired when we laid up.

Q. 14. Was the machine in operation at the time such movement or adjustment was made?

A. It was not.

Q. 15. Did you, in the summer of 1871, do any work upon the upper section of this dome or dam, and if so what?

A. I did; put in some braces for holding drill-pipe.

155 Q. 16. What was the effect of such work so done upon that section of the dam with reference to its capacity for movement?

(Objected to.)

A. It could not be moved until the braces had been taken out.

Q. 17. Were those braces ever taken out by orders of the defendant or either of them?

A. No, sir; they were not.

Q. 18. Was it worked in that immovable condition throughout the season of 1871.

(Objected to.)

A. It was.

Q. 19. Did you do any other work of a similar description upon this machine, and if so when and what was it that you did?

(Objected to.)

A. I did; in the winter of 1871 and 1872 put in other drill-braces and more drill-pipes.

Q. 20. What was the effect of this work so done upon this upper section with reference to its capacity for motion?

(Objected to.)

A. It made it immovable.

Q. 21. Did it so remain immovable during the next period of operation of the machine, and for how long did it continue in that condition?

(Objected to.)

A. It did until the collision with a steam canal-boat, which carried it away. This was in June or July, 1872.

156 Q. 22. After such collision, what was next done with reference to this upper section? Was it replaced; and, if so, how?

(Objected to.)

A. It was; by a wooden cylinder.

Q. 23. Was such cylinder movable or immovable?

(Objected to.)

A. When in operation it was immovable.

Q. 24. Was there any machine or apparatus for raising or lowering it, relatively to the dome or lower part?

(Objected to.)

A. There was not.

Q. 25. What effect, if any, upon the operation of the machine did this substitution of the cylinder you have last spoken of produce?

(Objected to.)

A. It was of decidedly better effect.

Q. 26. Before this upper section that you have first spoken of was rigidly attached to the dome, could it be raised or lowered while the machine was in operation?

A. It could not.

Q. 27. When this machine is in operation, is the dome or dam, or any part of it, attached to or suspended from the boat?

A. There is not any connection.

Q. 28. What is the use of the legs that appear in this model, attached to the lower part of the dome?

A. They are for levelling the dome.

157 Q. 29. Do they serve, or not, to keep the dome in its place? And if you answer in the negative, give your reason for so answering.

A. They do not; as we have used the dome without them since the first of November, until about the 25th of December.

Q. 30. Have any anchors ever been used attached to the lower, or any part of the dome while it was operated?

A. There have not.

Q. 31. For what purpose were the rings that appear on the lower edge of the dome used?

A. They were used for lashing the dome up to the deck of the scow, in case there were any repairs wanting to the cranes which hoisted it, or to keep the hoisting chains from crystalizing.

Q. 32. With what, if anything on the scow, were they connected?

A. With rings put in the deck and the bottom of the crane mast.

Q. 33. In what position was the dome or dam when such lashing was done?

A. Generally raised clear of the water.

Q. 34. Until the time that this wooden cylinder that you have spoken of was put upon the dome, what position did the top of the upper section occupy, relatively to the surface of the water when the machine was in operation?

A. Unless very shallow water, it was always submerged.

Q. 35. When the dome is in operation and working, what motion, if any, is there to the boat?

A. Well, according to wind and tide, at different times, there is a roll to it.

158 Q. 36. Is there any other motion than that you have spoken of?

A. Only where there are steamboats passing there are heavy swells which rock it considerable.

Q. 37. Does it not move backwards and forwards, as the tide is running in one direction or the other?

(Objected to as leading.)

A. It does. As the tide falls it lengthens the chain on one end; as it rises it shortens it again.

And being cross-examined by Mr. How, says:

X Q. 38. In your answer to the seventh question you do not refer, do you, to the first trial of the machine?

A. No, sir.

X Q. 39. That was January 3d, 1870, was it not?

A. I couldn't say to date, as I was not connected with the machine at that time.

X Q. 40. What were your duties on the machine on Diamond Reef, during the fall of 1870?

A. I was there as machinist.

X Q. 41. About how often were you there?

A. I was there every day.

X Q. 42. What work did you do while you were there?

A. Repaired drilling-engines and superintended the machinery in general.

X Q. 43. What other things did you do besides repairing the drilling-engines?

A. I run the drills at times, and run the hoisting-engine.

X Q. 44. For what purpose, or in doing what work, did you work the hoisting-engines?

159 A. For hoisting and lowering the dome.

X Q. 45. To what part of the apparatus were the hoisting-engines attached for hoisting and lowering the dome?

A. They were attached to chains attached to the dome proper.

X Q. 46. What was the object of hoisting and lowering the dome?

A. It had to be hoisted to shift from one place to another.

X Q. 47. How often was this done?

A. That I could not say.

X Q. 48. About how many times during the fall of 1870?

A. I could not say—keeping no account—not recollecting.

X Q. 49. Was it more or less than one hundred times?

A. I could not say—kept no account of the times shifted.

X Q. 50. Was it more or less than two hundred times?

A. I could not say.

X Q. 51. Was it more or less than three hundred times?

A. I kept no account—could not say.

X Q. 52. Give your best judgment.

A. I should suppose less.

X Q. 53. In your best judgment, how many times was this dome hoisted, as you have stated, during the fall of 1870?

A. I couldn't say to any certain number at all.

160 X Q. 54. Well, according to your best judgment, about how many?

A. It wouldn't do for me to say, for I don't know.

X Q. 55. Was it raised or lowered more or less than ten times during the fall of 1870?

A. I could not say.

X Q. 56. Did you know how the dome or dam was hoisted at each of the times that it was hoisted, and were you present at every single time that it was hoisted during the fall of 1870?

A. I know how it was hoisted, but as to being present every time I could not say.

X Q. 57. How do you know how it was hoisted when you were not present?

A. If it was hoisted, there was only one purchase that we had that would hoist it; and that was the hoisting-engine.

X Q. 58. At the time you saw the upper section of the dam or dome adjusted as you have stated, how or by what means was this adjustment made?

A. By connecting the tackles at the end of the cranes, and lowering the dome the desired distance.

X Q. 59. Was it elevated in the same manner?

A. It never was elevated to my knowledge other than that time.

X Q. 60. By what means was it elevated at that time?

A. As I have stated before, the tackles at the end of the cranes were

attached to the cylinder and the dome lowered to the desired distance, which elevated the upper section or cylinder.

X Q. 61. What was the object of this?

161 A. That I am not supposed to know, as it was done by instructions from the superintendent.

X Q. 62. What did you understand the object to be at the time?

A. I did not understand for what object it was raised.

X Q. 63. What is your opinion in regard to the object it was raised for?

(Objected to.)

A. I had no opinion about it. I done it according to orders.

X Q. 64. Do you mean to say that you did not know what it was raised for?

A. If I did know I have forgotten.

X Q. 65. What was the ordinary object of raising the upper section?

A. I don't recollect, if I ever did know.

X Q. 66. And yet you were continuously employed on this machine, were you not?

A. I was.

X Q. 67. And you mean to say, then, that you were a machinist on that machine, that you worked on it continuously during the time you have mentioned, and yet that you do not know the purpose for which the upper section or cylinder of the dam or dome was raised or lowered, do you?

A. I do not know for what reason it was raised.

A Q. 68. And have no idea, have you?

A. I have not, as at that time I had nothing to do with the working of the scow, no more than the engines. That is, I had charge of the engines, and had nothing to do with working the scow.

162 X Q. 69. Could you not, while working the engines, know why this cylindrical section of the dam was raised and lowered, or how it was raised and lowered?

(Objected to as assuming that the witness has testified that such cylindrical section was lowered.)

A. I have already stated how it was raised; but it never was lowered to my knowledge.

X Q. 70. Question repeated.

A. I could tell how it was raised and lowered while working at my engines, but I could not tell why unless the superintendent had informed me, which he did not.

X Q. 71. At the time this cylindrical section was raised, as you have stated, what depth of water were you working in?

A. I could not say, having nothing to do with taking soundings.

X Q. 72. About how long had this machine been in operation on Diamond Reef when this change was made?

A. We hadn't commenced operations.

X Q. 73. Did you not say that this was done in the spring of 1871, and that you commenced operations on Diamond Reef with the machine in 1870?

A. The cylinder was raised in the spring of 1871, when we went from laying up, making improvements, before we commenced operation.

X Q. 74. And you commenced work with that machine on that reef in 1870, did you not?

A. We went on Diamond Reef in 1870; in the fall of 1870.

X Q. 75. How much did you deepen the water on Diamond Reef during the fall of 1870 with this machine?

163 A. Couldn't say. I had nothing to do with taking soundings.

X Q. 76. Well, about how much, as near as you know?

A. I don't know nothing at all about the deepening of the water.

X Q. 77. It was deepen'd some, was it not?

A. I don't know*n*; I couldn't say.

X Q. 78. When a certain depth of rock has been excavated, and it was desired to reach a lower depth, what was done?

A. The dome was placed as near as possible in the same position, holes drilled to the depth desired, and blasted.

X Q. 79. What was the height*h* of the cylindrical portion, or telescope, above the lower dome portion of the dam, before the former was raised, as you have stated?

A. About nine to twelve inches.

X Q. 80. After it was raised as you have stated, how high was it then?

A. About five foot six inches, total height*h*.

X Q. 81. Who ordered this cylindrical portion or telescope raised as you have stated?

A. The superintendent, S. T. Pierce.

X Q. 82. Where does said Pierce now reside?

A. He is dead.

X Q. 83. Give the names of the persons employed on this apparatus in the fall of 1870?

A. That, sir, I could not do—give the names of all the persons employed there.

X Q. 84. Give the names of as many as you can of the persons employed on that machine in the fall of 1870?

164 A. S. T. Pierce, Lawrence Quinn, Jacob Peterson, William Ruinsford, Martin Miller. That is all I can remember.

X Q. 85. How many persons in all were employed on that machine that fall?

A. I do not know.

X Q. 86. About how many?

A. I could not say.

X Q. 87. How many did it take to work the machine at a time?

A. I do not know.

X Q. 88. About how many?

A. I don't know how many it took.

X Q. 89. Cannot you tell about how many?

A. I cannot.

X Q. 90. Did it take more or less than ten?

A. I do not know.

X Q. 91. Did it take more or less than twenty?

A. I do not know.

X Q. 92. Did it take more or less than thirty?

A. I should suppose less.

X Q. 93. What was the height*h* of the lower or dome portion of the dam, from the bottom to the top, in this machine?

A. About fourteen feet.

X Q. 94. What was the height*h* of the deck of the scow, from the water?

A. About four foot six inches.

165 X Q. 95. How near to the deck of the scow did the bridges come, when they were let down for working?

A. Please tell me what year you mean, as there were alterations made at different periods.

X Q. 96. At what time or times was the height of the bridges from the deck changed?

(Objected to as irrelevant, there being no question in the pleadings, or in the plaintiffs' patent, of any bridges such as those inquired of, and also because the witness in his direct testimony has not made any mention of such bridges.)

A. In the spring of 1871.

X Q. 97. How high were they from the deck in the fall of 1870?

(Objected to for the reasons last above stated.)

A. When in operation they laid on the well combing, about three inches from the deck.

X Q. 98. How high were they from the deck, after the change you speak of was made?

(Objected to as before.)

A. In the neighborhood of ten or twelve inches.

X Q. 99. Was their distance from the deck, when let down for operation, ever changed after that?

(Objected to as before.)

A. Never, until they were taken away altogether.

X Q. 100. When was that?

A. That was in the summer of 1872.

X Q. 101. How high was the telescope or cylindrical portion above the top of the dome or lower portion of the dam, when the machine was moved from Diamond Reef to Coenties Reef?

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A. About five feet six inches.

X Q. 102. Were you on board of the machine when it was moved from Coenties Reef to Frying-Pan Reef?

A. I was.

X Q. 103. About how far did the telescope project above the dome, at that time?

A. About five foot six inches.

X Q. 104. Did you operate the machine on Frying-Pan Reef, with the cylinder at that height above the dome?

A. We did.

X Q. 105. In what conditions of the tide?

A. In all conditions.

X Q. 106. Do you know what was the depth of the water at low tide on Frying-Pan Reef, when you first commenced work on it, as you have stated?

A. I do not.

X Q. 107. Are the braces referred to in your answer to question 15 shown in the model, Exhibit D?

A. They are.

X Q. 108. State what those braces are, and so describe them that they can be identified in the model, from your answer.

A. They are the braces that are around the bottom of the drill-pipe. They are an iron band that goes around the drill-pipe. They are not the same exactly, in the model, as I put them in first.

X Q. 109. How do they differ from the braces you put in?

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A. They are lower down and do not project through, as those that I put in had a key-lock to attach them on the other side.

X Q. 110. Is that all the difference?

A. There is more of them in the model than I had.

X Q. 111. Is there any other difference?

A. That is all the difference.

X Q. 112. What were the other braces you speak of in your answer to question 19?

A. That is, I put in drill-pipes, similar to what is in the model, and braces accordingly.

X Q. 113. At what height, above the top of the dome, did the telescope project when it was carried away by the canal boat, as you have stated, in 1872?

A. About five foot six inches.

X Q. 114. What was the use of the wooden cylinder spoken of in your answer to the 22d question; what purpose did it accomplish?

A. It was a guide for hoisting stone out of the dome.

X Q. 115. Any other purpose?

A. That's about all.

X Q. 116. You say that is about all. Is it quite all?

A. That is all.

X Q. 117. In what respect did this wooden cylinder work better than the previous one which was in the machine from 1870 till some time in 1872?

A. It was higher, and in case of collision it would do no injury to the scow.

X Q. 118. Why was its being higher an advantage?

168 A. Because we could get the stone tub down without the tide interfering with it.

X Q. 119. What persons worked on this machine in 1871?

A. I don't know. I couldn't tell you.

X Q. 120. Did you yourself work on it all that season?

A. I did.

X Q. What persons worked on it in 1872?

A. 121. I could not tell the whole of them.

X Q. 122. Tell what you can.

A. C. A. Eccleston, Challis Korrew, Philip Marr, William Brody, James Brody, William Rainsford, Thomas Mulligan, Isaac Jervis, John Shaw, Charles Graham, Martin Miller, John Hickman, Jacob Peterson, James Sheppard, S. B. Reeves, George Mohring William Morhoff, John Fullerton, Joseph Hudson, Edward Hudson, Frank Pike, Max Junker, James McElroy, John Troy, Patrick Finerty, Peter McCabe, Henry Stroud, Isaac Demarest, Lawrence Quinn, John Haggerty, John Hogan. That's all I can remember now. There are a few more, but I can't remember them.

And being re-examined by H. E. Davies, jr., says as follows:

R. D. Q. 123. Was the machine in operation at the time this raising the upper section of which you have spoken was made?

A. It was not. We had just moored ourselves on the reef.

R. D. Q. 124. Had you begun the work of the season?

A. We had not got in operation.

R. D. Q. 125. Did you ever see, or did you ever know, of any motion of this upper cylinder, other than the instance you have spoken of?

169 A. Nothing, only when cut to pieces for repairs.

R. D. Q. 126. If the operation of raising or lowering this upper section had been undertaken, would not your services have been required in so doing?

A. It would.

R. D. Q. 127. You said on your cross-examination that the braces you put in the upper section were not fully shown in the model; how did they differ from those shown in the model?

(Objected to, as the witness has not stated that he put any braces in the upper section.)

A. They had ends on to them which were longer and were fastened with a key on the outside of the cylinder.

R. D. Q. 128. What effect, if any, did the putting these braces upon the cylinder have upon its power of motion?

A. It could not be raised.

And being recross-examined by Mr. How, says:

Re-X Q. 129. What were these braces bolted to?

A. They were keyed fast to the cylinder.

Re-X Q. 130. How far were these braces from the bottom of the cylinder?

A. About ten inches.

Re-X Q. 131. How long was the cylinder?

A. I could not say. I have forgotten the length of the cylinder.

Re-X Q. 132. Was the cylinder of greater or less length than the height of the dome?

A. Less.

Re-X. Q. 133. How much less?

170 A. I couldn't say exactly.

Re-X Q. 134. About how much less?

A. To the best of my judgment about six feet less.

Re-X Q. 135. Then, if I understand you as you now state the matter, the braces you have spoken of pass through the cylinder, and when the cylinder was raised up so that they struck against the frame in the dome by which the cylinder is supported, they prevented it from being raised any further; is this correct?

A. That is correct.

Re-X Q. 136. That was all their effect, so far as the raising or the lowering of the cylinder was concerned, was it?

A. The cylinder could not be lowered on account of being mashed, through a collision.

Re-X Q. 137. But the braces did not prevent its being lowered, did they?

A. They did not.

And being examined in the re-redirect, by Mr. Davies, says:

Re-Re-D. Q. 138. At the time you put in the braces it was incapable of being lowered, was it not?

A. It was.

Re-Re-D. Q. 139. These braces prevented it from being raised, did they not?

A. They did.

HORACE F. RODMAN.

Sworn and subscribed to before me this 30th day of January, 1873.

G. IRVINE WHITEHEAD,
Special Examiner.

Adjourned to Monday, February 3, 1873, at 11 o'clock a. m.

171 NEW YORK, *February 3d*, 1873—11 o'clock a. m.

Met pursuant to adjournment.

Present, counsel for both parties.

CHARLES A. ECCLESTON, a witness on part of respondent, being produced and duly sworn, to interrogatories propounded by Mr. Davies, says:

Q. 1. What is your name, age, residence, and occupation?

A. Charles A. Eccleston. I am thirty-five years old; reside at 194 Greene avenue, Brooklyn. I am superintendent of the United States steam-drilling scow.

Q. 2. For how long have you held that position?

A. Since March, 1872.

Q. 3. What are your duties as such superintendent in connection with this steam-drilling scow?

A. To drill and remove rocks in the harbor of New York at any point designated by General Newton.

Q. 4. How much time have you devoted to your duties as superintendent since your employment as such?

A. All my time. I have watched it by night and day, and endeavored to make myself familiar with it and its uses for any and all purposes.

Q. 5. Previous to the time of your employment as such superintendent had you any knowledge of or acquaintance with the operation of this machine; and if you answer yea, state for how long a time you had such knowledge, and where and when the same was obtained?

A. In 1871 I was employed as superintendent of engineers on Governor's Island, under General Newton; said scow was employed on Diamond and Coenties Reefs. I made frequent visits to it, watched
172 its workings, and discussed its merits with General Newton frequently. This knowledge was gained during the whole season of 1871.

Q. 6. Prior to your entering upon your duties as superintendent of this scow, what had been your previous occupation for the past four years?

A. For two years of the time mentioned, I had been superintendent of engineers. Previous to that I had been farming.

Q. 7. What were your duties as superintendent of engineers?

A. To superintend the construction of batteries on Governor's and Bedloe's Islands, or any other work assigned me by General Newton.

Q. 8. Your duties as such were performed in and about the harbor of New York, were they not?

A. They were.

Q. 9. From your past employment and experience, are you familiar with the harbor of New York, with its tides and currents, and the necessary means of handling and securing vessels therein?

A. My past employment dates further back than the harbor of New York. I have had varied experience in other waters, which has very much aided and assisted me in becoming familiar with the tides and currents in this harbor, and I claim to be familiar with the handling and securing vessels in this or other harbors.

Q. 10. Have you studied and examined the question of practically and successfully drilling, blasting, and excavating rock under water in a tide-way? and state what experience and knowledge you have upon that subject, and how the same has been obtained.

A. I have studied it, and had sleepless nights in consequence. I have examined, and have the facilities for making examination and
173 putting to the test any project I had in view. This knowledge has been gained by the practical experience in this harbor, on four of the largest or principal reefs in it. To aid me in gaining this knowledge, I have under my charge a very efficient corps of men, including draughtsmen, machinists, divers, and all appliances known of and used for this purpose, in addition to the best and most powerful machinery that I have any knowledge of, with the daily instructions received from General Newton upon this class of work.

Q. 11. Have you examined and are you familiar with the designs and mode of operation of machines intended for this work, other than the one upon which you have been so employed?

A. I have examined several; but one in particular presented here, and marked "Exhibit E." The others mentioned are of almost daily occurrence, about every mechanic I meet with having a pet project for doing this work.

Q. 12. When you assumed charge of the machine or scow of which you are now superintendent, in what condition as to their relative mobility did you find the two sections of which the dome or dam is formed?

A. They were immovable; that is, the two sections were connected, or made fast.

Q. 13. During the time of your connection therewith as superintendent, and so long as the dome was composed of said two sections, was any movement of one section into or out of the other made, attempted, or designed?

A. There never was.

Q. 14. Was any such movement possible with the machine being constructed as you found it, and as you have described it?

A. None, other than cutting it out.

Q. 15. Was that upper section at any time so cut out or removed; and, if so, when and how?

174 A. The steamer Cathcart collided with the scow, went under the scow, and carried away the dome some four hundred feet from its original position, and into about eighty feet of water. When we found the dome, and carried it back to the reef, and hoisted it in the well-hole, I found the upper section smashed all to pieces, and supported by the broken projections of iron from it on the top or throat of the dome. We cut it out, and sent it away to Governor's Island.

Q. 16. Was this section so taken out replaced, or a similar one put in? And if to this you answer no, state what, if anything, was done to the dome after this section was so removed.

A. When this was taken away, we did not put a similar one in, but put in a wooden cylinder, much longer.

Q. 17. Is this model now shown you a correct representation of the dome or dam as last altered as you have described?

(Objected to.)

A. It is.

(Model offered in evidence, marked "Respondent's Exhibit No. 1, G. I, W., S. E.")

(Objected to.)

Q. 18. In the machine, as existing, after the addition of the upper wooden cylinder which you have described, is there any capacity for movement of the dome and cylinder relatively to each other?

A. None whatever, without you commence to take it down, on the same principle that you would any other permanent structure.

Q. 19. What effect, if any, has the substitution of this present wooden cylinder had upon the operation and working of the machine?

175 A. It gave us more confidence, in case of collision, that we should carry it away without injury to the scow. It being higher, enabled us to send down the diver while the tide was yet running, and the principal use was for sending down the stone-tub for hoisting stone out of the dome. It was a conductor for it. It was of further use on account of the changes of the current, there being a counter-current, or a current running one way at the bottom and another way at the top; and quite frequently it happened that, in waiting for slack water on top,

we found a strong current at the bottom, rendering it impossible for the diver to do any work.

Q. 20. Describe the mode of operating of the machine represented in Exhibit D, and of which you have been superintendent.

A. After arriving at the reef on which we are to commence work, we first moor the scow in a proper and designated position. We then survey the bottom, by divers, ascertain the unevenness or the nature of the bottom upon which we are to commence work, ascertaining, if possible, the stratification of the rock, in which direction it runs, lower the dome, let go the legs, when we had them, for the purpose of leveling said dome, then detach the chains, lower the bridges, put in the drills, and commence drilling operations. After drilling the holes to the desired depth, take out the drills, hoist the bridges out of the way, send down the divers, hook on the dome, hoist it; after having raised it in the well-hole, we move far enough away to commence blasting operations.

Q. 21. Before the upper cylinder, of which you have spoken, was carried away by the collision, what was the position of its top, relatively to the surface of the water, while the machine was in operation?

A. It was always submerged.

Q. 22. When the dome is lowered for operation, and ready to work, is there any connection between it and the boat or the scow?

A. None whatever; it is entirely disconnected.

176 Q. 23. Have any anchors ever been used attached to the lower part of the dome to hold it in position while in operation?

A. No.

Q. 24. What is the use of the legs projecting from the lower part of the dome, as represented in that model, Exhibit D?

A. For the purpose of levelling it.

Q. 25. Are they intended, or do they afford a support against lateral pressure and so hold the dome in position? and if to this question you answer in the negative, give your reason for so answering.

A. I never heard them spoken of as being intended for that purpose; I never considered them useful for that purpose. Practical experience has demonstrated to me that I could drill as successfully without them as with them.

Q. 26. What practical experience, if any, have you had to warrant you in giving the last answer?

A. I have drilled on Pot Rock thirty-nine holes, an average of six feet per hole, without them, and have experienced no difficulty; and the work above mentioned was performed on what I believe to be the most difficult reef to work upon in this harbor.

(Counsel for complainants objects in time to the last two questions and answers.)

Q. 27. Did the absence of these legs have any effect upon the stability of the dome?

(Objected to.)

A. I have no knowledge of it having any effect, inasmuch as I never experienced any movement or found any movement of the dome.

177 Wherever we placed it there we found it, until we moved it by our machinery, or other vessels collided with us and carried it off the reef. And that only occurred once, viz, in the case of the Cathcart, as I have before mentioned, and then we had the legs attached.

Q. 28. From your experience with this machine and knowledge upon the subject of submarine drilling, upon what, in your opinion, does the dome represented in the defendant's machine depend for its stability?

(Objected to.)

A. It depends for its lateral non-movement upon its weight and shape; its shape being peculiarly adapted for the purpose for which it was designed and built.

Q. 29. When this machine is in operation what is the position of the scow with reference to the dome, relatively to freedom of movement?

A. The scow is free to move around, it being entirely disconnected with the dome.

Q. 30. How is the scow moored while the machine is in operation?

A. It is moored by anchors run from the deck of the scow in such directions as are required to keep it in position over the dome.

Q. 31. What effect in practice do these anchors have on the scow, with reference to keeping it immovable?

A. I have found it impossible to keep the scow in one position during the running and changing of tides and currents. It is controlled to a certain extent by the tides and currents above mentioned; likewise the rise and fall of the tide.

Q. 32. What effect upon the operation of the machine would the attachment of this dome or dam permanently to the scow have?

178 A. Well, it would move it with the scow and that would defeat the object for which we use it, it having to be immovable.

Q. 33. What, in your opinion, is the use to which this dome or dam serves during the operation of drilling?

A. It is a support for the drill-pipes; it remaining in one position keeps the drill-pipes in one position; therefore makes the drill-pipes conductors for the drills, which enables the drill to penetrate the rock at a desired point.

Q. 34. Have you examined and are you familiar with the machine described in the complainants' letters-patent, and partially described in the model, Exhibit E, and with its intended mode of operation?

A. I have examined the model, have read his letters-patent, and endeavored to familiarize myself with what its working operations might be in case it was put to work.

Q. 35. From your knowledge and experience state whether or not such a machine or apparatus as that last referred to is useful or practicable; and if to this question you answer in the negative, give your reasons for making such answer.

(Objected to on the ground that the defendants, having used the invention, have by such use, in the present case, admitted its utility, and are, therefore, estopped from denying the same.)

A. In my opinion it is not useful or practicable, for the following reasons: Its shape is decidedly impracticable for successful operations on reefs in this harbor. The changes of the tides and currents would render it almost useless. Its almost rigid connection with boats, floats, or deck of scow would be another cause for its impracticability. The system of anchorage is such that it would be certainly fatal to the whole machine if attempted to be moored by such as are represented in this model. Experience has proved to me that there must be no rigid connection between the deck of scow, boats, or floats and the object

179 used for drill-pipes to pass through. The legs or spuds represented in this model would require a bottom constructed to suit them. That being impossible, I know of no advantage they would be to it. I have spoken of the shape of the so-called still-water dam, and assert that it is a misnomer. I know of no way that it could be made a still-water dam, for the reason of there being unequal formations at the bot-

tom of the river would admit of the water boiling up from underneath in a running tide. In connection with the boats or floats before mentioned, there is no provision made for holding it steady, much less than is shown in the model as being almost rigid, as is required by the so-called dam and drill-pipes connected with it. The system of anchorage shown in the model would tend to turn over the dam; and the greater the strain on the anchors or anchor-chains the greater would be its inclination to turn over. That, in connection with the very impracticable shape of the dam, making no provision for the tide striking it broadside, as is inevitable in some cases, would certainly tilt it enough to bind the drills when used.

Q. 36. In your answer to the last question you have stated that, owing to the shape of the dam referred to, changes in the tides or currents would render it useless. State fully and particularly how said changes would act upon said dam, and what effect they would produce.

(Objection to question 35 repeated.)

A. For the purpose of removing reefs in this harbor, it quite frequently happens that we have to moor in the bend of a river. Thus, for instance, on Frying Pan there is counter-currents, and the current changes very frequently during one running tide. The first of the tide may possibly strike the bow, or pointed end of the dam, and the strength of the tide would strike it on its side. On the reverse, or ebb-tide, on account of the formation of the river, it would strike it on the opposite side to the one it struck it in the tide before mentioned. In further illustration, place it on Pot Rock, and the full strength of the ebb-tide would strike it on the side; and on a flood-tide the position that it would
180 strike the dam would depend upon what part of the reef it was placed. This dam, for working purposes, necessarily would have to be in one position during all these changes of one tide that I have mentioned.

Q. 37. State fully and particularly what effect such changes of the tide as you have described would have upon the apparatus or machine referred to, the same being in operation.

(Same objection continued.)

A. It would undoubtedly stop drilling operations. The drills would become bound in the holes. There would be no possible means of drilling.

Q. 38. State what forces are exerted, and how they act to produce this result of stopping drilling operations that you have stated.

(Same objection continued.)

A. I have before stated, the water or tide, in combination with the impracticable mode of anchoring, would tend to lift the bottom of the dam up and turn it over.

Q. 39. You have stated that the connection of the dam with the boat was a reason for its impracticability; state how and why such connection with the boat would tend to render the machine impracticable.

(Same objection continued.)

A. I have stated that for successful operations in drilling, the dam must not be connected with the boat or float. The boat or float must move freely in all directions.

Q. 40. Now will you please state the reason why the boat or float must not be connected with the dam?

(Same objection continued.)

A. First, in case of collision, the dam and boat would be very
181 apt to be smashed all to pieces. For instance, drills being in the rock, and in the pipes, the pipes being connected with the boat,

there would certainly be great destruction to both dam, pipes, and boat; and this provision for collisions is a very important provision to be made. In proof of the above, the machine now used has been collided with thirteen times between the 21st of August and the 28th of December, 1872.

Q. 41. Is there any other reason why a rigid connection of the boat with the dam would interfere with the operation of drilling? And, if so, state it.

(Same objection continued, and the further objection that the witness has already several times stated his objections to the construction referred to, and the repetition of substantially the same question so many times is improper.)

A. I don't recollect any other than I have stated.

Q. 42. When the dome, represented in the model, Exhibit D, is lowered, what effect does that have upon the water enclosed within it during the running of the tide?

A. The action of the running tide makes the water boil up very violently in the dome.

Q. 43. What effect does the running of the tide have upon the boat or scow represented in the defendants' model, Exhibit D?

A. On account of the formation of the bows of the scow, the scow being an obstacle in the running water, tends to make the current strike underneath it with more rapidity, and the faster the tide runs the more the anchor pulls the scow into the water.

Adjourned to February 4th, 1873, at 11 o'clock a. m.

182 NEW YORK, *February* 4, 1873—11 o'clock a. m.

Met pursuant to adjournment.

Present: Counsel for both parties, and the witness Charles A. Eccleston, whose examination being resumed, he says:

Q. 44. You have stated that the system of anchorage adopted in the machine described in the complainants' letters-patent, and shown in the model, (complainants' Exhibit E,) would be fatal to the successful operation of such machine. State how and in what way such system of anchorage would produce that result.

(Same objection as to question 35; and counsel for complainants, to save repetition of this objection, here enters the same as a general objection to any testimony on the part of the defendants tending to prove want of utility of the invention set forth in said letters-patent of the complainants.)

A. The boats or floats would move with the tide, carrying the top section of the dam with it, and would tilt the dam on one side, taking the drill-pipes out of line and bind the drills, and make it impossible to drill. The anchors or anchor-chains represented, connected with the bottom of complainants' dam, would aid in tilting said dam.

Q. 45. If the upper section of the dam or dome represented in Exhibit D had been made movable, could or could not the same be raised or lowered while the machine was in operation?

A. It could not be moved.

And, being cross-examined by Mr. How, says:

X Q. 46. Are you not one of the defendants in this suit?

A. I am, I believe.

183 X Q. 47. During the time since you have been appointed to the superintendency of the drilling-scow you have mentioned, how often have you seen it?

A. Every day since my first appointment, with one exception.

X Q. 48. When was that?

A. That was about the middle of July, 1872.

X Q. 49. Where was the scow at that time?

A. In Hell-Gate, over Frying-Pan Reef.

X Q. 50. How often did you see it while it was laid up at Greenpoint for repairs and alterations?

A. I have no knowledge of omitting seeing it for one day after I took charge of it.

X Q. 51. By "General Newton," do you mean John Newton, one of the defendants in this cause, wherever you use this expression in your testimony?

A. I do.

X Q. 52. Did you do anything more on the drilling-scow than to superintend and direct its operations under the direction of the defendant Newton?

A. I assisted in most all its operations; quite frequently took a hand in any portion of the work that required assistance.

X Q. 53. State more particularly what work you did on the drilling-scow while you were engaged on it.

A. I went down under water several times, and assisted in pulling ropes. I don't recollect anything other than I have stated.

X Q. 54. About how large a portion of the twenty-four hours in each day, on the average, have you been on board said steam drilling-scow during the time you have been engaged in its operations?

184 A. I have quite frequently been on board of it the whole of the twenty-four hours, sometimes for thirty hours in succession, only leaving it for an hour or two for the purpose of going to Hallett's Point on business in connection with the scow and to get something to eat. The average for the year I couldn't say. I average about five or six hours for every working day, sometimes more and sometimes less.

X Q. 55. For what other purpose, besides submarine drilling, did you make yourself familiar with the use of the said steam-drilling scow?

A. Used it for removing stone off Pot Rock Reef.

X Q. 56. Any other?

A. No.

X Q. 57. What purposes besides submarine drilling did you refer to in your answer to question four?

A. For removing rock, hard-pan, or any substances we came in contact with, for the purpose of accomplishing the purpose desired, viz, removing obstacles to enable us to get the depth of water required.

X Q. 58. About how often during the season of 1871 did you see the said steam-drilling scow?

A. Almost daily.

X Q. 59. About how often during that time did you go on board of it?

A. From fifteen to twenty times.

X Q. 60. During this season of 1871 about how often did you see the said machine operated?

A. I saw it in operation almost every time it was operated.

X Q. 61. During this time how often did you see the telescope

185 or upper section of the dam slid upward or downward, relatively to the lower section; that is to say, so as to increase or diminish the height of the top of the one from the bottom of the other?

A. I never saw it moved.

X Q. 62. Does your familiarity with the harbor of New York include a knowledge of its soundings?

A. It does in the locations where I have been at work.

X Q. 63. What was the depth of water on Coenties Reef, at low tide, at the time the steam-drilling scow was first put in operation upon it?

A. I don't know. I have stated that I knew the depth of water since I had worked upon it only.

X Q. 64. Then your knowledge of the soundings in the harbor of New York is only derived from your operations with the steam-drilling scow. Is that what you mean?

A. My positive knowledge is derived in this way.

X Q. 65. And you have no other knowledge, have you, of the soundings in the harbor of New York? If you have, state what knowledge.

A. I have knowledge derived from seeing official charts or surveys.

X Q. 66. Now, from the knowledge you have derived from these official charts, what was the depth of water on Coenties Reef, at low tide, at the time the steam-drilling scow was first put in operation upon it?

A. About fifteen feet.

X Q. 67. What was the depth of the water, at low tide, on Coenties Reef when the work of the said steam-drilling scow on it was finished?

A. I have no knowledge, no survey having been made since we left it.

186 X Q. 68. Do you mean to say that you have no knowledge how far down you had got with your work when you left Coenties Reef?

A. I have not. That part or branch of the business is performed by scientific men from instrumental surveys.

X Q. 69. And you have no idea how deep the water was on Coenties Reef when the steam-drilling scow left it for the last time?

A. I do not have ideas upon official matters; I rely upon nothing but practical results obtained from the proper official sources.

X Q. 70. Do you mean by your last answer that the only way you could possibly have any knowledge of the depth of water on Coenties Reef, at the time stated, would be to have seen a statement of it in an official report, or to have received the information from a surveying-officer?

A. I could have had such knowledge by taking soundings with sounding-lines, but they are very inaccurate, and do not rely upon them for that purpose; I having no instruments for that purpose under my charge. Another difficulty, the débris or broken rock not being removed when we left it, I could not possibly tell.

X Q. 71. Do you mean to be understood that you had no idea whatever of the depth of the water at low tide on Coenties Reef when you left working on it?

A. I could guess, and it be only a guess. I have no accurate idea of the depth of water.

X Q. 72. How deep do you suppose it to have been at low tide?

(Objected to as calling for an opinion on the subject on which the witness has stated he could form no judgment.)

A. I suppose about twenty feet.

187 X Q. 73. How deep did the bottom of the dome go down below the surface of the water, at low tide, when you last worked on Coenties Reef?

A. About twenty to twenty-one feet.

X Q. 74. How deep was the water on Diamond Reef at the time that the said steam-drilling scow was first used on it?

A. From fourteen to fifteen feet, at low tide.

X Q. 75. How deep was it, at low tide, when the said steam-drilling scow was last used on it?

A. The shoalest spot, about nineteen feet.

X Q. 76. How deep was it on other parts of this reef at that time?

A. I don't know.

X Q. 77. State as nearly as you can.

A. Running from nineteen to twenty-four feet.

X Q. 78. What was the depth of water on Frying-Pan Reef when the steam-drilling scow was first set to drilling upon it?

O. Seventeen feet six inches at low tide.

X Q. 79. How deep was the water on Frying-Pan Reef at low tide when the steam-drilling scow finished drilling upon it?

A. About seventeen feet six inches.

X Q. 80. What was the depth of water on Pot Rock when you commenced operations there with the steam-drilling scow?

A. About twenty feet.

X Q. 81. What was the depth, at low tide, when you last worked on Pot Rock with the steam-drilling scow?

188 A. About twenty-one feet, that being the portion of the reef we had not worked on.

X Q. 82. How deep was it where you had worked.

A. I have no accurate knowledge of the depth of water on the portion mentioned.

X Q. 83. Did you not frequently measure for the purpose of ascertaining the depth?

A. I did.

X Q. 84. And yet you don't know; is that it?

A. And yet I don't know accurately.

X Q. 85. State as nearly as you can.

A. From twenty-three to twenty-four feet.

X Q. 86. What other vessels have you ever handled in the harbor of New York besides the steam-scow heretofore referred to in your testimony?

A. I have never handled any.

X Q. 87. What is the variation caused by the tide in the depth of water on Diamond and Coenties Reefs?

A. About six or seven feet.

X Q. 88. How much is it at Frying-Pan Reef and Pot Rock?

A. It varies from six to eight feet.

X Q. 89. What is the velocity of the current at Coenties and Diamond Reefs in the strength of the tide?

A. I have no accurate knowledge.

X Q. 90. State as near as you can.

A. From three to four knots an hour.

X Q. 91. Please state this velocity in miles per hour.

189 A. A little more than four and a half miles; a fraction more.

X Q. 92. What is the velocity of the current at Frying-Pan Reef and Pot Rock in the strength of tide?

A. From eight to nine and a half miles per hour.

X Q. 93. What appliances, besides the steam-drilling scow you have spoken of, have you ever used for drilling, blasting, and excavating rock under water?

A. None.

X Q. 94. What four largest or principal reefs in the harbor of New York have you had experience on, as stated in your answer to question ten?

A. Diamond, Coenties, Frying-Pan, and Pot-Rock Reefs.

X Q. 95. How are the two sections of the dam connected or made fast, as stated in your answer to the twelfth interrogatory?

A. The throat of the dome was round, and the upper section not being exactly round, became jammed in putting it in, and we couldn't move it one way or the other. The upper section became jammed in the lower section.

X Q. 96. How did it become so jammed?

A. It was jammed in the effort made to get it down far enough to bolt it and make it fast to the lower section.

X Q. 97. When was that?

A. When the scow lay at Greenpoint, in the spring of 1872.

X Q. 98. Was any attempt made to bolt that fast at any other time?

A. Not to my knowledge.

190 X Q. 99. Do not you know that while the scow lay it Greenpoint, in 1872, as you have stated, the upper section or cylinder was slid entirely down in the lower section of the dam?

A. I do not.

X Q. 100. How much did it lack of it?

A. I never saw it go farther down than the place where it became stuck and there remain, about five feet six inches from the top of the curbing to the top of the dome.

X Q. 101. The way that this cylinder was thrown out of shape, so as to make it difficult to run it up and down, was by a collision, was it not?

A. I know nothing upon that point but hearsay. I never knew that the object was to run it up and down. I don't know any object to be gained by said action.

X Q. 102. What did you understand to be the use of the racks on the outside of the cylinder and the pawls attached to the dome which work into them, as shown in the model, Exhibit D?

A. I know of no use that they were made of. They certainly were not in condition to be made use of since I have had charge of it.

X Q. 103. And you did not understand what they were for; is that what you mean?

A. I can only imagine. I can't see any practical use for them.

X Q. 104. Did you not know of the cylinder or upper section of the dam being taken entirely out of the dome, or lower section, while it was at Greenpoint?

A. I do know it was taken out for the purpose of being repaired.

X Q. 105. How repaired?

191 A. The plates of the upper section to be reformed, to make it conform to its original shape?

X Q. 106. For what purpose?

A. Te be put in, fastened down, and used as a curbing or support for drill-pipes.

X Q. 107. But, as I understand your previous testimony, it was already so fast in the dome that it was difficult to move it; how, then, could this repair be at all necessary?

A. I know the fact that I found it out when I took charge of the scow, that it was put in and became stuck in the throat of the dome, as I have already stated, and that it was intended and ordered to be placed in and secured and used for the purpose of an iron curbing and as a support for drill-pipes.

X Q. 108. Then the cylinder getting stuck in the throat of the dome, of which you have testified, was after you took charge of the scow. Is that what you mean in your last answer?

A. It is.

X Q. 109. Since you first became acquainted with this machine you have seen the cylinder projecting at different heights above the top of the dome, have you not?

A. I have not, to my knowledge.

X Q. 110. Do you mean to say that it was always set at the same height above the top of the dome?

A. So far as my knowledge goes, it was.

X Q. 111. What was the height of the dome or lower section of the dam from its bottom to its top?

A. Fourteen feet four inches.

X Q. 112. What was the length of the telescope or cylinder to which you have testified?

192 A. Nine feet.

X Q. 113. What was the height of the deck of the scow above water?

A. It varies from four feet six, to five feet six, according to the amount of coal, water, and other material on board.

X Q. 114. What was the draught of the scow?

A. It varies, likewise, from four to five feet.

X Q. 115. How high above the deck of the scow were the bridges set which are shown in the model, Exhibit D, when they were let down for working the drills?

A. The heel of said bridges were nine inches above the deck; the centre of them about sixteen or seventeen.

X Q. 116. State particularly the date at which the scow was taken to Greenpoint to be repaired, as you have stated, and when she was taken from there and set to work again in drilling rock.

A. I have not stated that she was taken to Greenpoint. I took charge of her while she was at Greenpoint, and moved her from there, and anchored her over Diamond Reef, May 6, 1872.

X Q. 117. While she was as Greenpoint, or before she went there, the question of infringement which is being tried in this suit came up, or was pending, was it not?

A. I never heard of this suit or infringement mentioned until two or three months after I had taken charge of her, and then I had no knowledge of what the infringement was or claimed to be.

X Q. 118. Did you not know while the scow laid at Greenpoint that experts were sent on board of her in relation to this question of infringement?

(Objected to.)

193 A. I did not.

X Q. 119. What were the changes made in this machine, while at Greenpoint, other than you have described?

A. None, with the exception of friction-gear being attached to the engine for the purpose of facilitating the mooring of the scow, and the general repairs to place her in working condition after a year's wear and tear.

X Q. 120. Do you not know that additional drill-tubes were put in at that time?

A. There was additional drill-tubes put in the dome proper, to the number of ten. By the dome proper I mean the upper and lower section—the dome in its completeness.

X Q. 121. For what purpose, and at what cost?

(Objected to as immaterial and irrelevant.)

A. For the purpose of giving greater facilities for drilling in any and all directions, as may be desirable. I have no knowledge of the cost.

X Q. 122. When and where was this collision with the Cathcart, as you have stated in your answer to question fifteen?

A. It was the latter part of August—the 21st, I believe—1872, and occurred while we were anchored over Pot-Rock Reef.

X Q. 123. Why did you put in a longer cylinder, as you have stated in your answer to question sixteen?

A. For the purpose of conducting an iron stone-tub from near the surface of the water into the dome and down to the bottom of the river, and to carry out what was the original intention, as I believe it, to remove the rock from these reefs when it was shown that all other
194 means had failed, by the means I have referred to, of the United States steam-drilling scow.

X Q. 124. How are these angular pieces in Exhibit No. which project out from each side of the cylinder which forms the upper part of the dam attached to said cylinder in the present machine; by bolts, or how?

A. They are bolted on with ordinary bolts, and put on and taken off at will.

X Q. 125. Then, they are a temporary attachment, designed to be taken off when for any reason their presence is not desirable, are they?

A. They are; and have been taken off and repaired and put on again frequently.

X Q. 126. For what purpose were they put on?

A. To strengthen the wooden cylinder. This scow quite frequently going with the tide and breaking them and had likewise broken the cylinder.

X Q. 127. In all other respects the model, Exhibit No. shows the construction of this cylinder and its mode of attachment to the dome correctly, does it?

(Objected to on the ground that the witness has not testified that there is any difference between the model shown and the machine as it exists.)

A. It does; that is, I refer to the cylinder.

X Q. 128. My question refers to the mode of attachment as well as the cylinder.

A. Its mode of attachment is all right.

X Q. 129. Then, all that is necessary to let down this cylinder in the dome is to take off these angular pieces and change the position on the cylinder of the hooks or which support it in the dome, is it not?

A. I don't understand the question.

195 X Q. 130. Question repeated.

A. I don't understand what angular pieces are referred to.

X Q. 131. Question repeated, with the explanation that the angular pieces referred to are those of which the witness testified in his answers to questions 124 and 125.

A. My answers to questions 124 and 125 refer to the wood-work, as attached to said cylinder, and not to any angular pieces of iron.

X Q. 132. Then, all that is necessary to let down the cylinder in the dome is to take off this wood-work, of which you have last spoken, and change the position on the cylinder of the hooks or lugs which support it in the cylinder, is it not?

A. The cylinder, the wood-work, and the angular pieces of iron combine and make a perfect structure, and one would be no use without the others.

X Q. 133. Is that your answer?

A. Yes.

(Counsel for complainants here suggests that the question which the examiner has taken down, consisting of the words, "Is that your answer," are simply addressed to the witness to ascertain if that was his whole answer to the question, and was not designed as a question to be put upon the record. Said counsel, therefore, requests that the same may be stricken out.)

X Q. 134. Cross question 132 repeated.

(Objected to on the ground that the witness has already testified on that subject, and on being particularly interrogated has said that the testimony so given was his answer thereto.)

A. I have no other answer than the one previously given.

196 X Q. 135. Can you not tell whether such is the case or not?

A. What case do you refer to?

X Q. 136. I refer to the case suggested in cross-question 132.

A. I have no other answer.

X Q. 137. Do you mean to say that you cannot tell whether or not this is all that is necessary to let down the cylinder in the dome?

A. It would destroy the cylinder and its appurtenances. You could reduce its size by destroying it, and put all portions of it through in small parts—parts small enough to pass through the aperture.

X Q. 138. How would doing what is mentioned in cross-question 132 destroy the cylinder?

A. By destroying all its useful attachments.

X Q. 139. What useful attachments would it destroy?

A. Its supports, which are its most essential and useful attachments.

X Q. 140. How would changing the position of these supports on the cylinder destroy them?

A. Because it is only useful in its present position.

X Q. 141. Why?

A. It was built for a specific purpose, and to move it from its present position would destroy its usefulness.

X Q. 142. How so?

A. To move it at all its wooden attachments would have to be reduced in size or increased in size, and that would not be the cylinder we want or desire, and would require rebuilding.

X Q. 143. Why would the cylinder have to be rebuilt to lower
197 it in the dome, in the manner suggested in cross-question 132?

A. Because the wood-work and iron-work connected with said cylinder make it one perfect whole.

X Q. 144. And to take off either would destroy the cylinder; is that what you mean?

A. It would destroy its usefulness, the parts being inseparable for the purpose for which it was built.

X Q. 145. But the cylinder itself would not be injured by doing exactly what is stated in cross-question 132, would it?

A. It would be very materially injured; in fact, useless.

X Q. 146. In what respect would it be injured?

A. I have before stated, to make any change in it would injure it for the specific purpose for which it was built.

X Q. 147. My question does not propose the making any change whatever in the cylinder itself, but simply to change its position in the dome, in the manner described.

A. The cylinder is not a cylinder complete, for the purpose we require it, without the attachments mentioned.

X Q. 148. Why not?

A. Because it is not completed when these attachments are removed; are not on it.

X Q. 149. Why is it incomplete without these attachments?

A. Because it is not complete.

X Q. 150. Will you now state whether or not the cylinder can be let down to a lower position in the dome by taking off the angular
198 wood-work and changing the position on the cylinder of the hooks or lugs which support it in the dome?

A. The cylinder, hooks, and lugs and angular wood-work are necessary for its completion as a cylinder, and it cannot be lowered into the dome in that manner.

X Q. 151. Why not?

A. Because the angular wood-work and iron-work attached are made to fit on the outside of the dome, and occupy a larger space on the outside than the aperture in the top of the dome, therefore would not go in the aperture.

X Q. 152. How could the outside wood-work possibly affect the descent of the cylinder in the dome, if, as supposed by the question, it had been already removed?

A. It is not a supposable case, the wood-work being riveted together.

X Q. 153. But you stated, a short time ago, that these angular portions were attached to the cylinder by bolts; now you say the wood-work is riveted together. How is that? Please explain.

A. I then referred to the angular pieces of iron shown in the model and called angular irons.

X Q. 154. Do you mean to say that it would destroy the cylinder itself to take off the outside angular wood portions which are shown as attached to it in the model, Exhibit I?

A. I have before stated that it is only a complete cylinder in its entirety as represented in the model, Exhibit No. 1.

X Q. 155. No matter what you have before stated; please answer my question.

A. I have no other answer to make to said question.

199 X Q. 156. Is that the best answer you can make to cross-question 154?

A. It is the best and only answer to said question that I know of.

X Q. 157. Was the scow itself—and by this I now mean the boat proper—ever seriously injured by the iron cylinder in any of the collisions it had while the iron cylinder was in use in it?

A. It was not.

X Q. 158. Your increased confidence that the wooden cylinder would not injure the scow was because that it was weaker than the iron cylinder, was it not?

A. It was, and because it was wood against wood, in case of collision.

X Q. 159. How long is the wooden cylinder which you state was put in after the iron cylinder was taken out?

A. About fifteen feet.

X Q. 160. How far did it project above the top of the dome?

A. About eleven feet six inches.

X Q. 161. On what reefs did you use it?

A. On Pot Rock Reef.

X Q. 162. Anywhere else?

A. No.

X Q. 163. In that position, or, in other words, while working on Pot Rock, how near did the wooden cylinder come up to a level with the deck of the scow?

A. It varied according to the depth of water the dome was lowered in, and the state of the tide.

200 X Q. 164. State the extremes.

A. I have seen it flush with the deck of the scow and I have seen it entirely submerged, perhaps three or four feet under the water.

X Q. 165. In what position, in this respect, did it give the best results?

A. It answered our purpose in either way. It never went under the water so far as to destroy its usefulness for the purpose for which it was built.

X Q. 166. In which position, in this respect, did it answer best?

A. I would just as leave have it in one position as in the other, for all practical purposes. In either position it answered our purpose effectually.

X Q. 167. How much higher did this wooden cylinder extend up in or above the water on Pot Pock than the iron one did in the same place and under the same circumstances?

A. I don't know that they did ever stand in the same place on the reef. The wooden one proper is six feet higher than the iron one was when we had it above the top of the dome.

X Q. 168. The iron cylinder did not come up to the bottom of the scow when there was much tide running, did it, while the scow was on Pot Rock?

A. It depended entirely upon the depth of water and the state of the tide.

Adjourned to Friday, February 7, 1873, at 11 o'clock a. m.

201 NEW YORK, *February 7th*, 1873—11 o'clock a. m.

Met pursuant to adjournment.

Present: Counsel as before, and the witness, Charles A. Eccleston, whose cross-examination being resumed, says as follows:

X Q. 169. After you put in the cylinder, shown in Exhibit 1, could the divers work in all conditions of the tide?

A. No.

X Q. 170. Why not?

A. On account of the under-current or tide rushing underneath the bottom of the dome.

X Q. 171. And boiling up in the dome, as you have before mentioned?

A. Yes.

X Q. 172. That was all the difficulty, was it?

A. That was the difficulty.

X Q. 173. During how great a portion of the twenty-four hours of the day was this difficulty so serious as to prevent the divers from working?

A. Just as often as we attempted to work.

X Q. 174. What purpose do the angular wooden pieces, on the outside of the cylinder in Exhibit 1, serve?

A. They strengthen and support the cylinder.

X Q. 175. What other purposes, if any?

A. If they should happen to be set in the right direction they would break the force of the water on it.

X Q. 176. Was not that their principal object and purpose?

202 A. No, sir.

X Q. 177. You have stated that the wooden cylinder gave you more confidence that it would not injure the scow, because it was weaker than the iron one. Now, if this was an advantage to have it weak, so that it would not injure the scow, why did you strengthen it with these outside pieces?

A. When I made the cylinder I made it too weak for the purpose it was intended, and found I had to do something to prevent it collapsing.

X Q. 178. Then these outside wooden portions were put on after the cylinder had been made, put in, and tried, were they?

A. They were.

X Q. 179. How did you fasten them to the cylinder; by bolts or wood-screws?

A. By rivets.

X Q. 180. Why did you use rivets instead of bolts or wood-screws?

A. Because they were more handily obtained, and not as expensive. It was a permanent structure, and rivets were more permanent. There *is* both rivets screws and used in those.

X Q. 181. This change was made after this suit was commenced, I believe?

A. It was made as soon as the iron curbing was carried away by the collision with the Cathcart, and before I had any official knowledge of this suit, I believe.

X Q. 182. State the date at which this change was made.

A. I couldn't state exactly.

X Q. 183. State as nearly as you can.

203 A. It was in the latter part of August, or early in September, 1872.

X Q. 184. If you had had the wooden cylinder set in the dome in the same position that you say it now is, projecting eleven feet and six inches above the dome, when you first went on Coenties Reef and Diamond Reef with the machine, or when the machine was first worked there, it would have been impossible to get the bridges down so that you could work your drills, would it not, unless you first lowered the cylinder from that position?

A. I have stated that this cylinder was built for a specific purpose, without regard to drilling, and drilling was not taken into consideration through it.

X Q. 185. (Cross-question 184 repeated.)

A. That would depend upon the place it was lowered, or the depth of water it was lowered in, and the state of the tide when it was lowered.

X Q. 186. Suppose the tide was at low ebb, and the depths of water were those you have stated as having been the depths in those places at low tide?

A. I believe it would interfere with the lowering the bridges.

X Q. 187. Would it not have so interfered as to have prevented the bridges being lowered so that you could drill at all?

A. It possibly would.

X Q. 188. Don't you know that it would?

A. It is a nice calculation to make, and I cannot positively state that it would or would not.

(The witness explains:)

I didn't understand the term "low ebb" in cross-question 186. If the term "mean low water" had been, used I should have known what to make my calculations from and should have answered differently.

204 X Q. 189. How will you answer now?

A. That it would interfere with the lowering of the bridges.

X Q. 190. Please now to answer cross-questions 187 and 188.

A. It would interfere so as to prevent us drilling at all. Question 188 is answered in 187.

X Q. 191. But supposing it had been let down in the dome so as to be

only of the proper height, it would have then answered the purpose, would it not?

A. It is an impossibility; it cannot be lowered from its present height without partially destroying it. It is a permanent fixture.

X Q. 192. (Cross-question 191 repeated.)

A. The same answer.

X Q. 193. Then if you went upon a rock that was only fifteen feet under water, with the machine the same as it was used at Diamond and Coenties Reefs, except that you had this wooden cylinder set, as you have stated, in the dome, it would be impossible to drill till you took that cylinder out, would it?

A. It would. That cylinder was not put there for drilling purposes. I want to explain that last answer. There *is* twelve other locations in the dome to drill, and I have drilled successfully with that cylinder in.

X Q. 194. In water as shoal as that mentioned in the question?

A. Not as shoal water as that.

X Q. 195. You say in answer to question 21 that before the upper cylinder was carried away by the collision it was always submerged when the machine was in operation. How could this be in fourteen or fifteen feet of water, at low tide, which you have stated to have
205 been the depth on Diamond and Coenties Reefs when the machine first went to work there, if, as you say, you do not know of any change in the adjustment of that cylinder in the dome from extending five feet and six inches above the dome, as you have stated?

A. I have stated that my knowledge of the depth of water was gained from maps or charts, and not as an actual fact; and that the cylinder was submerged at all times, to the best of my knowledge, since I have had charge of it, when lowered for work. I have no recollection of ever seeing it exposed above the top of the water. The depths above mentioned were taken from old charts, and there has a great deal of work been done on said reefs between the time the charts were made and the time I took charge of it in the year 1872, thereby materially changing the depth of water.

X Q. 196. You mean to say that the vertical pointed bars at the bottom of the dome, and just inside thereof, in Exhibit D, have no tendency to anchor the dome when they are let down upon the rock, and that they do not perform any such function?

A. I have no actual knowledge that they do tend to anchor the dome. I have used the dome after a portion of them had been carried away and a portion broken in such a manner as to render them useless for any purpose, and the dome has never moved from the place where it was lowered, to my knowledge.

X Q. 197. Do you mean to say that they have no such tendency and perform no such effect?

A. I do mean to say that I have no practical knowledge of their performing any such service. I certainly never took them into consideration as of use for that service.

X Q. 198. Do you say that they do not perform any such service?

A. I say that I do not know. I have used the dome both with and without them, and it has remained stationary in both cases.

206 X Q. 199. Do you mean to say that you have used the machine for drilling purposes without any of them being in or connected with the dome?

A. I do not. What I mean to say is that they have been broken in such a manner that they were useless; some of them carried away en-

tirely, others broken so as to render them useless; and I have drilled with them in that way successfully.

X Q. 200. Were they in such a condition that none of them would rest on the rock?

A. That I cannot say; but I don't believe that any of them projected below the bottom of the dome.

X Q. 201. Then, if you do not know whether any of them rested upon the rock, how do you know that some of them did not rest upon the rock and hold the dome in place?

A. They are constructed so as to be used in equal distances round the dome, and are used, one in combination for the support of the dome with the other, and a portion of them being carried away would certainly render the others useless.

X Q. 202. Then do you mean to say that if a portion of them were carried away that it would prevent all the others from holding a particle upon the rock?

A. That depends entirely whether they were below the bottom of the dome, and the nature of the bottom of the river.

X Q. 203. Does not the form of the dome, in Exhibit D, have a tendency to cause the water to boil up inside of it more than it would if its sides were perpendicular?

A. The formation of the bottom of the river controls that question.

X Q. 204. You think it would, then, in some cases, do you?

207 A. I do not.

X Q. 205. You say when this machine was in operation the scow was entirely disconnected from the dome. How about the apparatus for operating the drills; was that attached to the scow or to the dome?

A. It was entirely disconnected from the dome. The apparatus for operating the drills was attached to the scow.

X Q. 206. When the tide changes cannot the anchor-chains in the scow be taken up or let out, as necessary, to conserve the position of the scow in the change of tide?

A. They have to be. The scow is controlled, to a certain extent, by the tide; moves freely with it, fore and aft, and from side to side; and we have to calculate upon the strength of the tide and how much it will move the scow during said tide, and take up and pay out our anchor-chains accordingly.

X Q. 207. If the machine was in a steady current instead of in a tide, this taking up and paying out the anchor-chains would not be necessary to keep the scow in the same position, would it?

A. I don't know what is meant by a steady current.

X Q. 208. I mean a current running steadily in the same direction.

A. I have no knowledge that it would; but my opinion is it would change from side to side.

X Q. 209. But suppose it was anchored laterally, what then?

A. If it was anchored laterally I feel convinced it would move.

X Q. 210. I mean anchored both laterally and longitudinally.

A. There is still other things to be taken into consideration before I can answer that question positively.

208 X Q. 211. Please state what other things, and then answer the question.

A. Unequal depths of water make an unequal strain on the anchor-chains, some resting on the bottom before others do. I don't think of any other. Not without you to change the position.

X Q. 212. Does not the dome or dam in Exhibit D serve to break the force of the current which would otherwise press against the drills or drill-tubes?

A. The drills are protected by the drill-pipes. The drill-pipes are held in position by the dome and iron-work attached thereto.

X Q. 213. (Cross-question 212 repeated.)

A. The dome proper, being an obstacle in the water, I have no doubt breaks the force of said water; but the current rushes from underneath and boils up in it in such a manner that I question whether it breaks the force of the water on a portion of the drill-pipes, at least.

X Q. 214. Please answer cross-question 212 definitely, either one way or the other.

A. I couldn't state positively. The dome or dam serves to hold the pipes in position.

X Q. 215. Is not the shape of the still-water dam shown in the complainants' patent better adapted to receive a current that comes upon it endwise than the shape of the dome in Exhibit D?

A. No. The shape of the dome in Exhibit D is preferable, inasmuch that the tendency of the water running on it acts as a compressor and keeps it down in position, and the faster the current the more compression and the more securely it remains.

X Q. 216. Would not a dam of the same capacity, constructed in the shape shown in Exhibit E, offer less resistance to the current coming endwise upon it than a dam constructed in the form shown in Exhibit D?

209 A. Resistance is not what is required. Resistance becomes assistance, as shown in model, Exhibit D. In explanation, the running water is made available and very useful for the purpose I have above mentioned.

(Answer objected to as entirely irresponsive.)

X Q. 217. (Cross question 216 repeated, with the request to the witness to answer the question as presented.)

A. There is no endwise to exhibit D; therefore I answered the question as previously recorded.

X Q. 218. I think I did not say anything about any endwise to Exhibit D, and I repeat cross-question 216.

A. There would not be as much surface exposed in Exhibit E as there would in Exhibit D.

X Q. 219. (Cross-question 216 again repeated).

A. Yes; I now understand the question.

X Q. 220. You have spoken of the drill-tubes in the machine described in the patent of the complainants being liable to be tilted out of position by reason of their connection with the boat or with the upper section. Suppose they were supported entirely in drill-tubes secured in the lower section, and did not have any connection with the upper sections or with the boat, they would not be liable to that disturbance, would they?

A. They would. The system of anchorage is such that would turn the dam, and of course that would tilt the tubes on one side.

X Q. 221. But suppose the lower section of the dam did not turn, how then?

A. Then the tubes would not turn.

X Q. 222. And in that case the drills would work efficiently, would they not?

A. If they remained in a stationary position.

Adjourned to Saturday, February 8, 1873, at 11 o'clock a. m.

210 NEW YORK, *February* 8, 1873, 11 o'clock a. m.

Met pursuant to adjournment.

Present: Counsel as before, and the witness Chas. A. Eccleston, who, being further examined by counsel for defendants, says:

R. D. Q. 223. In your cross-examination you have spoken of the extreme shoalest depth of water upon the various reefs concerning which you testified. Did the depth so given by you refer to the average depth at low water upon those reefs; and, if not, with reference to what did you speak?

A. It had reference to one point, that being the shoalest point of all, and had no reference to the average.

R. D. Q. 224. What was the average depth of the water at low tide on Coenties and on Diamond Reef at the time you were working on those reefs?

A. About the average depth of water on Coenties Reef was from twenty-three to twenty-four feet; and on Diamond Reef the average would be about twenty-three feet.

R. D. Q. 225. On your cross-examination you testified that you had never handled any other vessel except the steam-drilling scow represented in Exhibit D. Have you had experience with vessels other than in handling them; and, if so, what?

A. By the term "handle" I meant that I had never steered them; but I have had vessels under my charge, and had experience with them for a number of years.

R. D. Q. 226. In your cross-examination you have spoken of an attempt being made to bolt the upper section of the dome or dam, represented in Exhibit D, to the lower section, which was not completed. For what reason was that attempt abandoned?

211 A. The upper section became immovably fixed, and that being the object desired, there was no reason or necessity for bolting it.

R. D. Q. 227. Is not the wooden section of the dome or dam represented in defendants' Exhibit No. 1 rigidly fixed and incapable of being raised or lowered?

A. It is.

R. D. Q. 228. Is there any apparatus or machine on the scow in connection with which the dome or dam represented in said Exhibit No. 1 is used, by means of which the wooden cylinder represented in said Exhibit No. 1 can be raised or lowered?

A. There is not.

R. D. Q. 229. At what period of the tide is it possible for divers to work inside the dome or dam represented in said Exhibit No. 1?

A. Slack water only.

R. D. Q. 230. At what periods of the tide could divers work in the dome or dam represented in Exhibit D?

A. At slack water only.

R. D. Q. 231. What work did you do upon these reefs of which you have spoken other than drilling and blasting rock by means of this scow and dome?

A. Surface-blasting and grappling to remove the broken stone.

R. D. Q. 232. What proportion did the number of surface-blasts which you fired on these reefs bear to the number of blasts which were fired in holes made by the steam-drilling scow and dome?

A. On Diamond and Coenties Reef we fired fully two surface-blasts to every one fired in the holes made by the steam-drilling scow and dome. On the reefs in Hell Gate, more than three surface-blasts to every one in holes made by the steam-drilling scow and dome.

212 R. D. Q. 233. You have stated in your cross-examination that a dam such as that represented in Exhibit F would offer less resistance to a current striking it endwise than such a dam as that represented in Exhibit No. 1. State what effect such resistance would have upon each of those dams respectively.

(Objected to as not founded on the cross-examination.)

A. The resistance in dam Exhibit E would have the effect of moving it with the current. The resistance in the dam Exhibit No. 1 would have the effect of holding it more securely in its position.

R. D. Q. 234. Does the depth given as that of mean low water invariably represent the depth at low water upon the various reefs concerning which you have testified?

A. The water does not always run down to mean low water. Sometimes it is low tide at two feet above mean low water.

R. D. Q. 235. Has not the machine or apparatus represented in Exhibit D been successfully used in the most rapid currents of Hell Gate?

A. It has.

R. D. Q. 236. Is it possible, by paying out or taking in the chains by which the scow represented in Exhibit D is moored, to keep that scow perfectly steady and immovable in a tide-way or current?

A. It is not. It will move from four to six feet.

R. D. Q. 237. Did you ever see or know, in your experience, of a current that was uniformly steady and regular?

A. I have not.

213 R. D. Q. 238. Would not the wind produce an effect of motion upon such a structure as the scow represented in Exhibit D, or upon any similar vessel?

A. It would have an effect.

R. D. Q. 239. Can a floating object similar to the scow represented in Exhibit D be anchored in a current or tide-way so as to remain perfectly stationary?

A. It could not.

R. D. Q. 240. In your answer to cross-question 190 you stated that the height of the cylinder represented in Exhibit No. 1 would interfere with the lowering of the bridges so as to prevent drilling. Under what circumstances would it so interfere?

A. At low water only.

R. D. Q. 241. Do you desire to make any explanation or correction of the testimony heretofore given by you in this matter; and, if so, what?

A. In cross-question 74 I have stated that the water on Diamond Reef was from fourteen to fifteen feet at low tide. That was a mistake. It should have been nineteen feet; and the answer 74 was given by getting the said reefs confused or mixed in my mind.

Re-cross:

R. C. Q. 242. The depth mentioned in your answer to redirect question 224 was the depth of water on those reefs when you left them, was it not?

A. It was the depth of water gained from all the knowledge I had on this subject from charts and soundings.

R. C. Q. 243. Question repeated.

A. It was not.

R. C. Q. 244. To what time does your answer to question 224 then refer?

214 A. That refers to the time the charts were made.

R. C. Q. 245. When was that?

A. I don't know.

R. C. Q. 246. About when?

A. I don't know.

R. C. Q. 247. Were they made before you commenced work on those reefs?

A. I suppose they were. I found them in the office.

R. C. Q. 248. Were they made before the steam-drilling scow was used on those reefs?

A. I don't know.

R. C. Q. 249. What was the date of those charts?

A. I don't think they bear any date. I have never noticed it.

R. C. Q. 250. When and by whom were those soundings made which you mention in your answer to cross-question 244?

A. The soundings were made by any one of the men aboard the scow that was ordered to do it. The soundings that I refer to were made in the commencement of the session of 1872.

R. C. Q. 251. When was the attempt made, and where, to bolt the upper section of the dome or dam represented in Exhibit D to the lower section, as stated in your answer to redirect question 220?

A. At Greenpoint, I believe, some time in the latter part of April, 1872, I think.

R. C. Q. 252. What caused this section to become fixed so as to become immovable, as you have stated?

A. Its shape.

215 R. C. Q. 253. When did this occur?

A. In the latter part of April, 1872, or somewhere about that time.

R. C. Q. 254. Where?

A. At Greenpoint.

R. C. Q. 255. What collision or other disturbance occurred to it at that time because it became fixed?

A. No collision at that time. No disturbance.

R. C. Q. 256. Did it become fixed while you were trying to bolt it fast or while some one else was?

A. It became fixed when it was being put in for the purpose of bolting it fast.

R. C. Q. 257. What was the object of bolting it fast?

A. To keep it at one desired height and stationary.

R. C. Q. 258. Would not the pawls and racks shown in Exhibit D do that?

A. I don't know.

R. C. Q. 259. Do you know any reason why they should not?

A. Yes; they were always considered imperfect.

R. C. Q. 260. How imperfect?

A. Not capable of being used or worked on account of their imperfection.

R. C. Q. 261. In what respect were they imperfect?

A. The iron would corrode from its contact with the salt water, and they could not be moved.

R. C. Q. 262. What was the object of making the upper part of the dam fixed in the lower part and incapable of adjustment?

216 A. The object was to obey orders.

R. C. Q. 263. Whose orders?

A. Gen. John Newton's.

R. C. Q. 264. For what purpose are the rings and eyes at the extreme top of the wooden cylinders in Exhibit I?

A. For the purpose of making fast to it and have some place to take hold of it in case we had occasion to.

R. C. Q. 265. Occasion to for what purposes?

A. To lift it up away from the dome—make repairs to it, as we frequently had to do.

R. C. Q. 266. By means of what apparatus did you lift it up?

A. By some of the numerous booms that we had around the scow.

R. C. Q. 267. And you lowered it by the same means, did you?

A. We put it in the dome by the same means.

R. C. Q. 268. Would not the pressure of the current against the upper portion of the dam shown in Exhibit I have a tendency to turn the dam over—I mean the pressure of the current against the wooden portion of Exhibit I?

A. I never saw the dam move from any pressure it received from the current.

R. C. Q. 269. Question repeated.

A. I don't think it would have that effect.

R. C. Q. 270. Would it not have that tendency?

A. I don't know.

217 R. C. Q. 271. Were not the angular wooden portions, shown as attached to the cylinder in Exhibit I, put on for the very purpose of counteracting that tendency?

A. No.

R. C. Q. 272. The water sometimes runs down below mean low water, does it not, at low tide?

A. It does.

R. C. Q. 273. What is the diameter of the base of the dome in the machine represented in Exhibits D and I?

A. Thirty feet.

CHAS. A. ECCLESTON.

Sworn and subscribed to before me this 8th day of February, 1873.

G. IRVINE WHITEHEAD,
Special Examiner.

Adjourned till Tuesday, February 11, 1873, at 11 o'clock a. m.

NEW YORK, *February* 11, 1873—11 o'clock a. m.

Met pursuant to adjournment.

Present: Counsel for both parties.

It is admitted that the defendant, Mr. Isetts, received the letter marked "Complainants' Exhibit K," on or about the 16th of July, 1872.

ZEALOUS B. TOWER, a witness on the part of the respondent, being produced, sworn, and examined, in answer to interrogatories propounded by Mr. Davies, deposes and says:

Q. 1. What is your name, age, residence, and occupation?

218 A. Zealous B. Tower; I am past fifty years of age; I reside in the city of New York, 170 Fifth avenue; I am an officer of engineers in the United States Army.

Q. 2. Have you any acquaintance or knowledge with the subject of submarine drilling and blasting, of excavating rock or other material under water, and with tides and currents in harbors; and if so, what and how obtained?

A. Only such as I have learned from conversation with those who have had direction of such submarine blasting and from reading some

published accounts. I have some knowledge of the action of currents from my services on works situated in harbors of the United States; also from my studies.

Q. 3. Are you acquainted or familiar with machines designed and used for the purposes of the work referred to in the last question and with their construction and operation?

A. What you mean by "familiar" I don't know.

Q. 4. By the term familiar I intend to convey the idea of your having seen such things operated or used, or have read concerning such operation and use, and can speak concerning them with knowledge obtained in either of the two methods described.

A. My education at West Point, involving a knowledge of the mechanical powers, dynamics, statics, hydrostatics, and the other branches of science, is the basis of my education, and it enables me to judge of the action of forces and of the suitableness of machinery to effect its purpose. My occupation as an officer of the Corps of Engineers of the U. S. Army, in charge of works of construction in the harbors, the use of boats, the building of walls, the study of questions of harbor improvements and river improvements, in connection with my education and my frequent observation of the action of currents upon vessels and upon constructions in water, through a period of nearly thirty years, enable me to judge of the effects of tides and currents upon caissons,
219 or rather constructions to be used in tides. For the past six years, as a member of the board of engineers for fortifications, I have been called upon to examine and report upon the various machines or devices connected with gun-carriages, floating obstructions, and torpedoes.

Q. 5. Have you examined the letters-patent of the complainants in this action and the model Exhibit E presented in this cause?

A. I have.

Q. 6. Do you understand the construction and intended mode of operation of the machine described in such letters-patent and in the model last referred to?

A. I do.

Q. 7. Have you examined and do you know the mode of construction and of operation of the machine or apparatus described in the model Exhibit D, and do you know the principles upon which it is operated, and the object and intention of its different appliances?

A. I have examined it, and I understand its construction, its essential features, the principle upon which it is devised, and the manner of its operation.

Q. 8. From your knowledge and experience, state whether or not the machine or apparatus described in the complainants' letters-patent and in the model Exhibit E can be practically and successfully used and operated for the objects for which it is designed; and if to this you answer in the negative, give fully and particularly your reasons for making such answer.

(Same objection as made to question 35, put to the witness Eccleston. Such objection to apply to all testimony offered by defendants to prove want of utility of the machine described in said letters-patent, whether this objection is repeated or not.)

A. I do not think that it can be used successfully in a tide-way
220 or in rivers with a rapid or even a medium current. I do not think it could be used in any current sufficiently rapid to require special care in the support for the drills.

I do not think the guides or cylinders can possibly be held quiet

enough to permit the drill to be used. This device is a metallic caisson essentially supported from a float above, from which it is suspended by chains attached to the lower section. It is designed to be held in position in part by four chains attached to anchors, passing through rings on the lower section, and extending to windlasses on the float. In part by vertical bars of iron passing through slides on the lower section, and extending to the bottom surface of rock or debris. This caisson will not be stable—that is, immovable in a current. The action of the tension upon the anchoring-chain being equal in the part above its attachment to the lower section and in the part extending to the anchor, gives a resultant force, dividing the angle made by the two portions of the chain. Every variation of the current will cause a variation of that force, and will tend to raise or depress this lower section according as the current is larger or smaller, greater or less. The current operates more strongly, in fact entirely, upon the up-stream half of this caisson, and this varying motion of the resultant will cause a surging motion in the lower section of the caisson. In the same manner the variations in the current will act upon the side chains, according as it is felt more strongly on one side than on the other. Any inclination of the lower section will incline the drill-tubes so as to make them bind in the hole and prevent their motion.

Another fault of this construction is its suspension from the float above. It is impossible to hold a large vessel still in a current. Currents are never exactly uniform, either in force or direction. They usually increase from the beginning of slack-water till nearly the end of ebb-tide. As it is impossible to make a chain drawn by force perfectly straight, it will sag on the side where the current diminishes and straighten more where the current is strongest, so that any vessel anchored will have a surging motion, and not be perfectly stable.

221 If the float moves from its position, the upper section of the caisson must move with it. This motion must be communicated by virtue of the connection of the parts to the lowest section, which must move sufficient to prevent the drills from being operated. There is not sufficient elasticity in the connection of these different sections to permit a motion of the float, such as must necessarily take place, without dragging or moving the lowest section enough to disturb the positions of the drill-tubes. Therefore the connections must break or the motion take place.

I think there will always be play enough in the self-anchors, as they pass through their guides to permit sufficient motion with the tendency of the surging motion of the caisson, to make the drills bind in the holes, so that they cannot be raised or fall by their own weight. It is my conviction that the lower section cannot be held still enough by the appliances shown in the device to permit drilling in tide-waters or in a rapid or medium current.

Q. 9. Upon what does the dam or dome represented in Exhibit D depend for stability when in operation?

A. It is a mass resting by the force of its own weight upon legs standing upon the natural surface, precisely the same as if it were out of water, so far as the effect of gravity holds it in position. The conditions are such as would give stable equilibrium so far as gravity alone is concerned.

The effect of the tide upon it, running water, rather serves to press it down—to increase its stability, than to move it, so far as the dome alone is involved. Running water striking a surface inclined to the horizon will either tend to raise or depress such surface, as the angle of in-

cidence is acute or obtuse. The running water strikes against this spherical surface which is made up of an infinite number of little plane surfaces, everywhere, with an obtuse angle, and will tend to press it down. The impinging force, by the law of mechanics, may be resolved into two forces by the problem of the parallelogram of forces, one
222 perpendicular to the surface of the sphere, the other in the direction of a tangent. This perpendicular force will pass through the centre of the sphere; therefore it passes within its base, and is largely productive of stability. Tangential force, which operates at right angles to the normal force, exerts no other effect than what is produced by friction. The friction of water against a surface is very small, and will have a very slight tendency to overcome the large normal force.

I will further illustrate this question of stability by the fact that the water rises over the surface of the dome. It can only be forced upward by the dome itself, and the force that raises the water up is in reality a down pressure on the dome. Were you to attempt to draw that dome through water, supposing the material to have the same specific gravity as water, the action of the surface against the water would cause it to go downwards. This illustration is simply a practical method of exhibiting the theory of the pressures upon the dome explained above.

Q. 10. Would such an apparatus as that described in the complainants' letters-patent and in Exhibit E produce still water within the dam if placed in a moving current or tide-way?

(Same objection as to question 8.)

A. No caisson will produce still water unless its connection with the bottom is tight, and at the same time its upper section rises to the level of the water. Currents passing below any caisson having no bottom will impart motion to the water within. Any current flowing over the top of the caisson will impart motion to the water within.

Q. 11. What is your rank in the service?

A. I am a lieutenant-colonel in the Corps of Engineers, and a brevet major-general of the United States Army.

And being cross-examined by Mr. How, says:

X Q. 12. Have all or a large share of your conversations on the
223 subject of submarine blasting, mentioned in your answer to the second question, been conversations with the defendants in this suit, or some one of them?

A. The two officers with whom I have conversed in order to acquire information with reference to blasting under water have been Generals Newton and J. G. Foster, those two officers having been in charge of nearly all the blasting done under the direction of the Engineer Corps.

X Q. 13. What practical experience have you had with the action of currents?

A. My first experience was at Old Point Comfort, Virginia, where for several years I determined all the soundings around Fort Calhoun—then called—with a view to determine the annual subsidence of the fort or foundations. I made these soundings in rapid currents, and for this purpose was obliged to cause piles to be driven, and to stretch ropes from the shore to these piles, in order to hold the boat in position with sufficient accuracy to obtain accurate work. I saw there the enormous force of running water, and upon the sounding-rods, and the difficulty of getting rods to the bottom in a vertical position in strong currents.

After the Mexican war, in charge of the works in Portland Harbor, I built a wharf which gave me some experience with the tides, and my boating experience was very great. In California, at San Francisco, I

was five years in charge of works of construction at Alcatrazes Island and at Fort Point. I built a wharf at Alcatrazes Island, where the currents were strong, and was engaged in boating to and fro nearly the whole five years. I saw the action of tide upon vessels constantly, as I passed them, and the current at the wharves was always very strong.

I have made several journeys by sea, and observed somewhat the effect upon ships and steamers at anchor in the currents.

X Q. 14. What machines designed for or used in the work of submarine blasting are you acquainted with?

224 A. The machine used by Gen. J. G. Foster, of the Corps of Engineers, in blasting rocks in the channel at Newburyport and two channels of Boston Harbor; also used by Gen. Warren—that is, the work was under his direction—in New Haven Harbor. It is a tripod, according to my recollection, with adjustable legs and holding-guides for the drill, known as Townsend's device. I think more blasting has been done under Government with the aid of this machine than that of any other.

The second device is that by General Newton, Exhibit D. These two devices, similar in this respect, that they give a stable platform and an immovable guide for the drills, are the only two that I am familiar with.

X Q. 15. What do you understand to be the construction and intended mode of operation of the machine described in the complainants' letters-patent, referred to in your answer to the sixth question?

A. I suppose the inventor hoped to secure an enclosed space with still water. It is my opinion that the still water would not be attained.

Second. He strove to attain guides fixed in position for his drills. As in a previous answer describing this device, it is my opinion that the caisson in question cannot be held still enough to attain that end.

(So much of the answer as volunteers an opinion of the witness as to whether the intended result could be obtained, objected to as irresponsive and entirely volunteered on the part of the witness.)

X Q. 16. Do you mean in your last answer to be understood that the water would not be any stiller, or the force of the current be checked, by the enclosure referred to in your last answer?

(Objected to on the ground that counsel for the complainants having objected to the witness giving any testimony upon this point in his previous answer, cannot now inquire as to the testimony so objected to.)

225 A. The language is very direct. I said that it would not produce still water. The horizontal current will be impeded and other currents produced, ascending and descending, probably.

X Q. 17. Then, what you meant was that absolutely still water, without any motion whatever, could not be produced, was it?

A. I meant essentially still water.

X Q. 18. You have spoken in your testimony of the difficulties you experienced in sounding, from the current striking the sounding-rods, thereby making it difficult to get them down accurately. A drill would be influenced in the same way, if not protected from the force of the current, would it not?

A. If the drill were used without any guides, it would be moved by the current so as not to fall absolutely in a vertical direction.

X Q. 19. But the horizontal current is the one that the drills need protection against, is it not?

A. If there were no guides to the drills, they would require some other protection or aid for drilling. I conceive that all machines for drilling in running water require fixed guides to be successful.

X Q. 20. Suppose the drills in the machine described in the complain-

ants' patent were held in short drill-tubes, attached only to the lower section of the enclosure, would they not then be sufficiently steady to operate successfully; and, if not, why not?

A. If very short, the drill would in reality have too much play to fix itself, even though there were very slight motion to the lower section. If long enough to be a perfect guide, I still believe that the motions of the lower section, by virtue of the changing currents, would cause the drill to bind in the hole.

X Q. 21. Motion in which direction—laterally or longitudinally of the enclosure?

226 A. It is very difficult to fix the exact direction of the motion. I think that it would surge continually, as it does not rest by its own weight on the bottom.

X Q. 22. When you speak of the anchoring chain which runs through an eye at the bottom of the enclosure, or, as you call it, of the caisson, and say that the tension upon this anchoring chain would give a resultant force, dividing the angle made by the two portions of the chain, suppose this chain was not drawn taut, how then in regard to this point?

A. There would be so little tension on it that it would have very little effect.

X Q. 23. Then in that case, what you say about the effect of this resultant force would not apply, would it?

A. In that case it is no longer an anchor. It no longer serves the purpose of anchoring the caisson.

X Q. 24. Answer objected to as irresponsive and the question repeated.

A. That is my answer.

X Q. 25. Do you mean by your last answer that that is the best and only answer you can give to question 23?

A. I mean to say that when the chain is used in connection with the anchor and windlass above, and drawn so as to produce any effect upon the lower section of the caisson, that effect must be as described in my previous answer.

X Q. 26. But my question 23 does not suppose that state of things at all, but the reverse; and does not ask you to state what the result would be in any other state of things than that suggested by the question. Will you please now to answer question 23 instead of answering in regard to some other hypothesis? Please confine your answer to the question.

A. A loose chain lying on the bottom would produce no effect upon the caisson.

227 X Q. 27. You say in your testimony that any inclination of the lower section will incline the drill tubes so as to make them bind in the hole, and prevent their motion. Do you mean by this that any inclination, however slight that inclination might be, would accomplish this result, or must such inclination be considerable?

A. The inclination must be equal to or greater than the play of the drill in the tube.

X Q. 28. And besides that it must be in addition, equal to or greater than the play of the drill in the hole, must it not?

A. That reply has no connection with the hole—simply to the guiding tube.

X Q. 29. Then do you mean to say that the play of the drill in the hole would make no difference in this respect?

A. Not the slightest, the way the question was put.

X Q. 30. You say another fault of this construction, referring to the construction described in the complainants' letters-patent, is its suspension from the float above. Do you not find anything in the said letters-patent to indicate that the lower section is to rest on the bottom?

A. It is my impression that in the drawing the lower edge may have touched, or does touch, at some point the line representing the natural surface of the bottom; but from the description in the specifications, or the patent, and from the drawings, the support of the structure is the chains, and must be, as the lower section does not rest on the self-anchors; otherwise touching on one point the lower section would take whatever inclination the bottom had, provided the rigidity of construction would permit it to do so. Otherwise it would hang by the lips of connection of the different sections.

X Q. 31. And your testimony in this case has been based on the supposition that the enclosure, or the still-water dam as it is called
228 in the patent, was supported by the suspending chains instead of by resting on the bottom of the current, has it not?

A. I have studied it with reference to its applicability to be used in all sorts of tides and all sorts of bottoms, inclined, round, or any other shape. It cannot, from its construction, rest on the bottom except where the bottom is nearly level. Where the bottom was perfectly flat I have supposed that the lower section would rest there if it could be held there.

X Q. 32. Answer objected to as irresponsive, and question repeated, with the request that the witness give a categorical answer to the question and confine his answer strictly to the question asked.

A. I think that answer is a very proper answer to the question. I can't understand any other.

X Q. 33. Do you mean to say that you cannot tell definitely whether your testimony in this case has or has not been given with the understanding mentioned in cross-question 31?

(Objected to, as the witness has already answered this query in the answer given to cross-question 31.)

A. No; I do not mean to say that I cannot tell definitely what my opinions are.

X Q. 34. Please then state definitely whether your testimony has or has not been given in this cause upon the supposition or understanding mentioned in cross-question 31?

(Objected to, as being a repetition of a question already answered in the answer given to cross-question 31.)

A. My answer would be the same, because I can't give any other answer in effect. I have supposed the caisson generally supported by chains from above; that it might touch the bottom at some point
229 if the operator chose to let it; but I don't think that the construction would justify him in doing so unless the bottom were essentially or pretty nearly level.

X Q. 35. Suppose the anchor-chains were taken in or let out, as the case might be, exactly in proportion to the change in the tide, would not that keep the boat or float in substantially the same position?

A. Chains are not rigid enough, attached to anchors with a gentle inclination to the horizon, to hold a large float perfectly still in a running tide.

X Q. 36. My question does not ask whether the boat would be held perfectly still, but whether, under the conditions named in the question, it would be held in substantially the same position?

A. I cannot say whether the boat would move one, two, three, or four

feet. The amount of motion depends on the velocity of the current, and somewhat on the direction. I do not think this boat could be held still enough for drilling operations in such currents as we have in this harbor and at Hell Gate.

X Q. 37. Which would be held most steadily in a straight current by the same means, a scow such as represented in Exhibit D, or a boat or boats with a sharp bow, such as represented in Exhibit E?

A. I think, as a rule, the wider the vessel the less steadily it would be held. I am inclined to think that the opening in the centre would be in its favor if the width were the same. The width of structure acts unfavorably according to my opinion of the action of forces, in this, that they are further from the point of support, and hence the force has a larger lever to turn. The cross-section of the immersed portions of the boat being greater or less, of course oppose greater or less resistance to the current.

230 X Q. 38. Which then do you say would be held most steadily in a straight current with the same anchorage, a scow like Exhibit D shows, or pointed boats like those shown in Exhibit E?

(Objected to, as no question is raised in the pleadings in this action, or arises upon the complainants' letters-patent as to the form, shape, or structure of the boats or floats used in the machines of the respective parties.)

A. I cannot answer this question absolutely.

X Q. 39. Do you mean to say that the tide striking the dam, shown in Exhibit D, would exert its force on it in such a manner that it would be more difficult to move it in the direction of the tide than if no tide were striking it?

A. No.

X Q. 40. Would it not be much easier to move in that direction than it would be if no tide were running?

A. Certainly; because the normal pressure perpendicular to the surface of the dome, pressing it down onto the bottom, has a component parallel to the stream, and tending to move the dome down the stream, while the other component perpendicular to the bottom presses it down on the bottom. Of course the resistance of the hold on the bottom by the dome is not taken into consideration in my answer.

Adjourned to Wednesday, February 12, 1873, at 11 o'clock a. m.

231 NEW YORK, *February 12th*, 1873—11 o'clock a. m.

Met pursuant to adjournment.

Present, counsel for both parties, and the witness Zealous B. Tower, whose cross-examination being continued, says:

X Q. 41. You have stated that the pressure of the current upon the dome part, or lower part of the dam, would have a tendency to press it down upon the bottom. Would the pressure of the current upon the upper or cylindrical portion of the dam, shown in Exhibit D, have that effect or tendency?

A. No.

X Q. 42. Would not the pressure of the current upon the said upper or cylindrical portion have a tendency towards upsetting or tipping over the dam?

A. If the resultant of the pressure, due to the impinging of the water and of the weight of this cylindrical portion which acts vertically downward along its axis, should pass outside of the base, the tendency would be to overthrow the dome.

X Q. 43. I did not ask in cross-question 42 about any element except the pressure of the current against the cylindrical portion of the dam. Please observe the question, and answer as to that point without reference to any other.

A. The tendency of this force alone would be to overthrow the structure.

X Q. 44. And would not the horizontal force of the pressure of the current against the dome portion of the dam have the same tendency; I mean without reference to any other force, resultant or otherwise, except the horizontal force?

A. The horizontal force is the force of the current, and that tends to hold it down.

232 X Q. 45. Question repeated.

A. After the resolution of the force into two components, one vertical and the other horizontal, the horizontal force tends to move it or overturn it, and the vertical force to hold it down. I wish to state that there is, in my opinion, no existence of either the horizontal or the vertical forces only as they are resolved from the normal force, with a view to reduce the effect of that normal force in these two directions.

X Q. 46. In what direction is the normal force, as you call it, of the current, vertical or horizontal?

A. The normal force of the current acting upon a surface is perpendicular to that surface.

X Q. 47. Question repeated.

A. The normal force as alluded to above, in connection with this obstructing surface, is neither vertical nor horizontal.

X Q. 48. Question repeated.

A. I have answered the question as I used the term "normal."

X Q. 49. Please, then, state what the natural direction of the force of the current is, vertical or horizontal.

(Objected to, as the question does not state what current the counsel refers to.)

A. The living force of any current, estimated absolutely, is in the direction of a velocity, which is presumed to be essentially horizontal.

X Q. 50. Which would present the greatest resistance to a straight current in the direction of the length of the boat or support in each case, the dam shown in Exhibit D, or the dam shown in the complainants' letters-patent and in Exhibit E, supposing both to be of the same internal capacity?

233 A. It would require a calculation on my part to answer that question absolutely. The resistance offered by a surface to running water is estimated by the cross-section perpendicular to this running water. The pressure is regarded as equal to the weight of a column of water of which this cross-section is the base, and of which the altitude is twice the height h, due to the velocity of the water; this value has to be modified by a constant which depends more or less upon the shape of the surface against which the water impinges, and is a proper fraction.

X Q. 51. Which would the current have the greatest tendency to overturn, in a straight current—a dam of the form and proportions shown in Exhibit D, or one of the form and proportions shown in the complainants' letters-patent and in Exhibit E, both being of the same height h?

A. I think that the tendency to overturn would be greatest in Exhibit E.

X Q. 52. Do you mean when the current came in the direction of its length?

A. Under all circumstances.

X Q. 53. I understand you to have said substantially that the normal force of the current striking against the dome in Exhibit D resolved itself into two forces, one vertically downward and the other horizontal. Please state what proportion of this force would be resolved into vertical force, and what proportion into horizontal force in the direction of the current.

A. I gave my opinion that where was no such absolute resolution of the force, but with a view to estimating the effects in the two directions, vertical and horizontal, we resolved the force into these two component parts.

X Q. 54. Resolving this force into these two directions for the purpose, as you say, of estimating the effect, what proportion of it is vertical and what proportion horizontal?

234 A. The horizontal element is regarded by writers on this subject of hydrostatics as proportional to the square of the sine of the angle of incidence. The vertical element, according to my recollection, is proportional to one-half of the sine of twice the angle of incidence.

X Q. 55. State now, if you please, what these proportions are.

A. The horizontal force varies from the base of the dome to the top of the dome, from unity to zero. The vertical varies from the base of the dome up to an angle of forty-five degrees, from zero to unity; from that point to the top, from unity to zero. These are ratios. I must correct that last; it is from unity to one-half, and one-half to zero. This with reference to the vertical force.

X Q. 56. Question repeated.

(Objected to, as the witness has already answered the question fully and distinctly.)

A. That explanation of the forces applies more especially to the thread of the stream which impinges upon the plane passing through the axis. There will be a still further resolution of the forces striking on either side of this plane. The absolute determination of these different forces is a high problem of calculus. We judge of the effect by the direction of the normal to the surface, which passes, in this case, through the centre of the sphere. I have not worked out this problem to which I allude above.

X Q. 57. Then, if I understand your last answer, you cannot now tell what these proportions are; is that what you mean?

A. I can only say that the resultant of these two elements must pass through the centre.

X Q. 58. Question repeated.

235 A. The force of the impinging water is regarded with a view of estimating it as made up of an infinite number of elements striking the different points of the dome, producing a pressure at this point, in a direction normal to the surface, and that normal direction determines the question of stability, the horizontal elements and the vertical bearing such ratio to each other that their resultant must pass through the centre. Then the sum of all the horizontal forces, combined with the sum of the vertical forces, must have a resultant passing through the centre. The force exists as a normal force, and there is no necessity of this resolution with a view to determine the effect of that force.

X Q. 59. Answer objected to as entirely irresponsive, and the question again repeated.

A. No further than to say that the ratios must be such that the re-

sultant of the two forces must pass through the centre of gravity of the sphere.

X Q. 60. Do you mean by your answer to cross-question 54 that the resultant vertical force bears the same proportion to twice the sine of the angle of incidence that the resultant horizontal force bears to once the sine of the angle of incidence?

A. You have not stated it right; therefore I shall have to answer "no."

X Q. 61. Do you mean by your answer to the 54th cross-question that the horizontal element of this resultant force bears the same proportion to the square of the sine of the angle of incidence that the vertical force bears to one-half of the sine of twice the angle of incidence?

A. That is what I mean.

X Q. 62. Please state why the vertical resultant force does not bear the same proportion to the square of the sine of the angle of incidence that the horizontal resultant force does.

236 A. We would have to alter the laws regulating the action of forces to produce that effect. Resolving this normal force by the rule of the parallelogram of forces into two others at right angles to each other, one is of necessity proportional to the sine, the other proportional to the cosine of the direction of the original force with the two resolved directions. The normal force against an oblique surface exerted by water is itself proportional to the sine of the angle of incidence. One of these forces varies, therefore, with the product of the sine of the angle of incidence by itself, or as a sine square; the other as the product of the sine by the cosine of the angle of incidence. The product of the sine by the cosine is equal to one-half of the sine of twice the angle.

X Q. 63. But my question asks why. Will you please state that? Will you please state any reason why the cosine of the angle of incidence should not bear the same relation to one of these resultant forces that the sine of the angle of incidence does to the other?

A. I have not said that they do not bear that relation. They do bear the relation of the sine multiplied by the sine to the sine multiplied by the cosine, which is precisely the same relation as that given before in real value.

X Q. 64. But can you state any reason why they should not bear the same relation of the sine multiplied by the sine to the cosine multiplied by the cosine?

A. Certainly. The normal element is itself equal to the impinging force multiplied by the sine of the angle of incidence. The two forces into which this is resolved are proportional, one to the sine, the other to the cosine of the same angle. They bear the same proportion to each other as these two lines denominated sine and cosine of the angle. To obtain the value of one of these forces we multiply the normal force which contains the sine by this sine of the angle which this component makes with the normal. To obtain the vertical component we multiply this normal force, the expression for the value of which contains

237 the sine of the angle of incidence, by the cosine. One expression must have the sine multiplied by itself, the other the sine multiplied by the cosine.

X Q. 65. How far within the base of the dome in Exhibit D will the resultant force from the current pass?

A. I have not calculated it. It passes through the centre of the base, the dome alone considered; the friction of the running water being also excluded.

X Q. 66. You mean by your answer to question 10 that absolute stillness of the water would not be produced, do you?

A. No, I do not mean absolute stillness.

X Q. 67. Would not the form of the dome or lower part of the dam in Exhibit D tend to produce a rising current inside of the dome on the side towards the tide or current?

A. I have not observed the effects of the tide within this dome. I cannot see any reason for its rising on the side towards the current.

X Q. 68. Do you mean by your answer to question 10 that the flowing of the water over the top of the caisson or dam would produce an injurious current inside of it?

(Objected to, as the witness in his answer to question 10 has not alluded to or mentioned an injurious current.)

A. I meant to say that water passing over other water would communicate some motion to it. I gave no opinion as to the velocity of that motion.

X Q. 69. On what duty are you at present engaged, and under whose direction? I mean as an officer of engineers.

238 A. I am a member of the board of engineers for fortifications upon the coasts of the United States. I am under the direction of Brigadier-General A. A. Humphreys, Chief of Engineers, United States Army.

X Q. 70. Do you receive your orders, all of them, direct from him, or do they or some of them come from or through some other person or officer; and if the latter, through or from whom?

A. My orders, with very few exceptions, come directly from General Humphreys. The ranking officer of this board of engineers might, and has on two or three occasions, given me an order to travel on some duty connected with the duties of the board, in conformity with the wishes of the board. I might receive an order from the Secretary of War through the Adjutant-General for some special purpose, but such order would usually be forwarded through the Chief of Engineers. Gen. J. G. Barnard is the ranking officer of the board.

X Q. 71. What are your relations in your official capacity to the defendant, General John Newton?

A. Whenever any of the fortifications under his charge are under discussion by board of engineers, he becomes, by virtue of orders from the Chief of Engineers, a member of said board. I have no other official relations to him.

And being re-examined by Mr. Davies, says:

R. D. Q. 72. If the lower section of the dam, represented in complainants' letters-patent and in Exhibit E, rested upon the bottom of the stream while the machine is being operated, would not a portion of said dam be suspended from the boat or float to which it is attached?

A. All the portion necessary to fill up the distance between the platform and the lower section would be suspended, according to my understanding of the specifications.

239 R. D. Q. 73. Such dam being in the position assumed in the previous question, what effect, if any, would motion of the boats or floats to which it is suspended have upon the lower section of the dam?

A. I want to know if you suppose it resting through all its length flat upon the bottom?

R. D. Q. 74. I mean resting its whole length upon a flat bottom, and by motion intend to mean lateral or longitudinal motion of the boat or float to which it is suspended.

A. In order that the lower section should remain upon the bottom both the chains at each end must be left loose. Any large motion of the

boat would have a tendency, through its connection with the lower section, to move it—to incline it sideways, if the motion were lateral.

R. D. Q. 75. Would there be any vertical force resulting from a horizontal current striking the dam represented in complainants' letters-patent and in Exhibit E?

A. As the sides are vertical, the normal component, being perpendicular to these sides, must be horizontal, and can therefore give no vertical component.

Z. B. TOWER,
Lieut. Col. of Eng'rs and Brevet Maj. Gen.

Sworn and subscribed to before me this 12th day of February, 1873.
G. IRVINE WHITEHEAD,
Special Examiner.

Adjourned to new notice.

240 NEW YORK, *March* 11, 1873—1 o'clock p. m.

Met pursuant to notice.
Present, counsel for both parties.

WILLIAM G. PECK, a witness on the part of the defendant, being produced and sworn, in answer to interrogatories propounded by Henry E. Davies, jr., esq., deposes and says, as follows:

Q. 1. What is your name, age, residence, and occupation?

A. William G. Peck. I am about fifty-two years of age. I reside at No. 126 East Thirty-fifth street, in this city, New York. I am professor of mathematics and astronomy in Columbia College, and of mechanics in the School of Mines. I teach mechanics in the college.

Q. 2. Are you familiar with mechines and the uses and applications of machinery, the laws governing the operation of different machines, and the principles of their construction? and give your reasons for any answer you may make.

(Counsel for complainant here enters a general objection to the examination of this witness in expert matters in this cause, for the reason that the defendants have already examined two witnesses as experts, and are not entitled by the usage and practice of the courts in such cases to examine more.)

A. I am familiar with the principles of machines and with the mechanical laws that govern their construction. I have been engaged in the study and teaching of the principles of mechanics and their applications to machines and engineering for many years. I have taught mechanics at the United States Military Academy, also in the University of Michigan, where I was professor of civil engineering; and, as I stated, I am now teaching mechanics at Columbia College and the School of Mines.

241 Q. 3. Have you examined the letters-patent of the complainants and their model, Exhibit E, and do you understand the design, construction, and intended mode of operation of the machine described in said letters-patent and in the model?

(Complainants' counsel further objects to this question on the ground that it does not appear that the witness has any acquaintance or familiarity with letters-patent or inventions.)

A. I have examined the letters-patent of the plaintiffs and the model known as Exhibit E. I understand the design and construction of the machine described in said letters-patent and represented in the model.

Q. 4. Have you examined the model known in this case as Exhibit D, and do you understand the design, construction, and intended mode of operation of the machine described in such model?

A. I have examined the model known as Exhibit D in this case. I understand its construction and use as designed to be exhibited by the model.

Q. 5. Look at the model, Exhibit D, and see if you there find the invention described in the first claim of the plaintiff's letters-patent, and give your reasons for any answer you may make to this question.

(Same objection as to question 3.)

A. I do not find in Exhibit D the invention claimed in the first claim of the plaintiff's letters-patent.

In forming this opinion I have carefully considered the fact that the upper portion of the model may be drawn out from the lower section by what may be termed an extension joint. The invention claimed by the patentee is the construction of a portable and an adjustable dam, in sliding or telescopic sections, in the manner and for the purposes described. That I may be understood in what I say hereafter, I wish to define the term principle, as applied to any mechanical device. By the term

242 principle I mean its law of action. No two machines or elements of machines have a common principle except they have a common law of action. The extension joint of Exhibit D and the telescopic joints of Exhibit E differ from each other in principle, because they differ from each other in their law of action. A telescopic joint is one which moves freely both in and out, and that that character of joint was intended to be described in the letters-patent is made evident by a provision introduced into its description for the introduction of friction-rollers should the sections not move freely both out and in.

In Exhibit D, on the contrary, an express arrangement is made to prevent the upper section from sliding out and in except by a particular arrangement which can only be applied when the machine is not in actual use.

Exhibit D is not a dam; it is not portable, in the ordinary sense of the word portable; it is not adjustable in the sense used by the patentee; and I understand him to mean by the word adjustable, capable of lengthening and shortening in a vertical direction with the rise and fall of the tide.

Neither is Exhibit D constructed and arranged for the purposes described in the letters-patent, which the patentee states to be to produce still water in which to operate for blasting and removing obstructions. The machine represented in Exhibit D is intended for no such purpose, but is simply intended as a stable frame or support for holding the drill-tubes used in drilling the rock below.

The model Exhibit D, furthermore, is a separate and independent structure, and when in use is totally disconnected with the float or boat. The difference in the manner of action of the sliding sections in these two machines is shown by the fact that when the lower section of Exhibit D is raised by the proper hoisting-apparatus it comes up as a whole. It is a unit. In Exhibit E, on the contrary, when the lower section is raised the next section slides into it, and so on until it is raised to its highest limit.

243 Q. 6. Do you find in the machine represented in the model Exhibit D the invention described in the second claim of plaintiffs letters-patent, and give your reasons for any answer you may give to this question?

A. I do not find it in the invention described in the second specifi-

cation of the plaintiffs letters-patent. What is claimed in the letters-patent is a number of sliding bars, moving freely up and down in sockets, for the purpose of taking hold of the bottom to prevent the machine from drifting laterally when acted upon by currents. In Exhibit D there are, it is true, sliding legs—not anchors—sliding only in one direction, and solely for the purpose of securing a firm support for the horizontal rim of the frame. That they are not intended to slide up and down freely is shown by the device employed to prevent them from sliding up after they have once reached the rock below the machine. This principle of sliding legs is common enough, and this method of clamping it by no means a novelty. I say that the principle of the sliding pieces in the two machines is radically different, for the reasons assigned in my last answer.

Q. 7. Do you find in the machine represented by the model Exhibit E the invention described in the third claim of complainants letters-patent?

A. I do not find it in the invention described in the third claim of the plaintiffs letters-patent. The plaintiff claims in that third specification a combination of boats, supports or floats with the dam. In Exhibit D there is no connection whatever between the boat or float and the machine that I have styled the frame for supporting the drill-tubes when in actual use. The plaintiff also claims in that specification a peculiar arrangement of anchors to hold the boat in position for the purposes described. No such combination of anchors exists in Exhibit D. The peculiarity in the anchoring arrangement in Exhibit E is the connection between the anchor and the deck of the boat by a chain or cable passing through a ring attached to the lower section of the dam. No such peculiarity exists in Exhibit D. This difference is fundamental and
244 is for many reasons a difference to the advantage of the model Exhibit D.

Q. 8. Do you find in the machine represented by the model Exhibit D the invention described in the fourth claim of the plaintiffs letters-patent? And give your reasons for any answer you may make.

A. I do not find in it the invention described in the fourth claim of plaintiffs letters-patent. There are in both Exhibits D and E windlasses and chains, but the combination and arrangement of these is radically different in the two machines. In Exhibit E the chains, windlasses, and boats are in continued and permanent connection with the dam. In Exhibit D these chains and windlasses, after having been used to lower the frame to its working position and to level its horizontal section by means of the sliding legs that I have described, are entirely detached from the frame, which is then left to itself to perform its true function, which is to give a firm, unvaried, unyielding support to the drill-tubes through which the drills are brought into contact with the work they have to perform.

Q. 9. Examine the model Exhibit E, and state what it represents.

A. It represents what I should call a flexible self-adjusting breakwater. It can hardly be called a dam.

Q. 10. Examine the model Exhibit D, and state what that represents.

A. It represents, as I have said, a solid, stable frame or support for sustaining the drill-tubes, which it carries in a fixed position. If it acts as a breakwater at all, it is purely incidental and due to the necessity of constructing the lower section so as to produce a degree of stability without which the drilling could not be accomplished.

Q. 11. Is not the construction in telescopic sections of machines de-

signed to increase or decrease in length a device that has been commonly for a long time in use and generally known?

245 (Objected to if it is intended to introduce any matter to anticipate the invention of the plaintiffs, or if it has that effect, on the ground that it is not pleaded.)

A. It is a device that has been known for a long time, and is in common use for the purposes mentioned.

Q. 12. Is there any similarity or resemblance in the construction, design, or operation of the respective telescopic parts of these models Exhibit D and Exhibit E?

A. The telescopic portions (although I object to considering Exhibit D as having any telescopic joint whatever) have no principle in common. They are not intended to accomplish the same end. They have not a common law of action. In a mechanical point of view, therefore, they are totally dissimilar.

Q. 13. Upon what do the machines represented in these two models, Exhibit D and Exhibit E, respectively, depend for support and stability when in operation?

A. Exhibit E depends for stability, so far as the lower section is concerned, upon the weight of that part of the dam which actually rests on the bottom and does not hang suspended from the deck of the raft; also upon the varying connection that exists between that section and the anchors passing through its rings. I do not think the stability is materially increased by what the patentee terms the self-anchors. The stability of the upper end of the dam or breakwater and of all the parts that hang suspended from the deck of the raft depends entirely upon the greater or less completeness of the mooring.

The stability of the machine represented by Exhibit D depends, first, upon its weight, modified, of course, by the buoyant action of the water; and secondly upon the action of the currents of water that flow over the hemispherical portion of it.

To explain the manner in which this gives rise to an increase of the stability I will observe that the pressure of the flowing stream

246 exerted against this hemispherical surface may at every point of that surface be regarded as equivalent to the action of two forces, one of which, acting tangentially, simply causes the water to flow past the hemisphere. The other, acting normally—that is, perpendicular to the surface of the sphere—is directed toward the centre and contributes, according to the value of this component, its share toward a great resultant force passing through the centre of the sphere; passing obliquely downward, presses the whole machine against the bottom of the stream, causing it to stand firmly and, so far as the currents are concerned, immovably upon the sliding and self-clamping legs already described.

By way of explanation, I will add that the figure at the bottom of the stream, traced out or indicated by the points of these self-clamping legs, is called the polygon of support. It is a law of mechanics that when the resultant of all the forces acting, including the weight, passes within this polygon of support, the structure will be stable. If the bottom operated upon is anywhere near level, the resultant of all these forces, including the weight, will pass through the center of this polygon, giving the best possible result, so far as stability is concerned. If the bottom is not quite level the resultant will approximate to that just described.

In Exhibit E, the resultant action of all the forces due to the current passes entirely without the polygon of support, and in such a manner

as to fulfill the conditions (so far as they are concerned) of maximum instability. Exhibit D is a firm and stable frame, Exhibit E is not.

Q. 14. Could the machine described in the complainants' letters-patent and in the model Exhibit E be practically and successfully operated for the purposes for which it is designed; and give your reasons for any answer that you may make.

A. I do not think it could be successfully operated for the purposes described and designed, for the reason that it does not, in my opinion, afford a sufficiently immovable support to permit the drills to be directed with the accuracy necessary to that species of work.

247 The three branches of the chain or cable represented in figure 1 accompanying the plaintiffs, letters-patent, by which I mean, first, the branch running directly from the anchor to the deck of the boat; second, the branch running from the anchor to the ring in the lower section of the dam; and third, the branch running from that ring to the deck of the boat, form a species of triangle in which the first branch may be called, roughly speaking, the hypothenuse. This branch, though not so represented in the diagram, has a certain sag, or curvature downwards, the curve being what we call a catenary.

Now the degree ot curvature in this hypothenuse depends entirely upon the tension which is exerted to straighten it, the curve approaching a straight line as the tension is increased. Any increased pressure against the float or raft, whether from the shock of a wave, an increase of the current, or any other cause, will tend to straighten out and elongate the real hypothenuse of the triangle; and as the other two sides are essentially straight and inextensible, this can only be produced by forcing the vertex of the opposite angle toward the hypothenuse, and this action must of necessity derange and throw out of place the entire lower section of the dam, with all the frame-work attached to it. The same causes operating upon the float or raft, according to the direction in which they produce their effect, must, from the very nature of the case, cause the raft to move back and forth to such a degree as to render the upper frame-work that guides the drills too movable to permit the kind of work in question. A vessel cannot be moored in a rapid current so as to retain an absolutely fixed position, from the very law of the catenary as I have described it.

Q. 15. Is there any difference in the mode of anchoring the boat shown in Exhibit D, and the ordinary and usual method of mooring any vessel in a rapid or shifting current?

A. I do not think there is.

248 Q. 16. Do you find in the model Exhibit D any part which is the equivalent of the lower section of the dam represented in Exhibit E?

A. I do not, for reasons that I have already given.

And being cross-examined by Mr. How, says:

X Q. 17. What do you understand to be the intended mode of operation of the machine described in the complainants' letters-patent and represented in complainants' exhibit E?

A. So far as what is called the dam is concerned, I understand that it is intended to be lowered by the chains for that purpose, until a sufficient length has been let out to strike the bottom. If there be after that any surplus length, I understand that the upper portion will be elongated and shortened as the raft or float to which it is attached at its upper end rises or falls. I understand that the frame-work for guiding the drills at the lower end is intended to remain essentially in the position in which it is placed, whilst the upper frame-work attached to the

deck of the raft, through which the drill-tubes pass, is to move up and down with the rise and fall of the tide, so as to afford a protection against the currents of water, without reference to the strength or state of the tide.

X Q. 18. Have you ever had any practical experience in mechanical operations?

A. I have practical experience in setting up and taking down, combining, arranging, and devising mechanical models for the instruction of my classes. If it is intended by the question to ask whether I have been engaged in carrying on any great mechanical operations, I will say that I have not.

X Q. 19. The practical experience stated in your last answer is all that you have had, is it?

A. I have had no other experience than that derived from operations in the class-room, as I have stated.

249 X Q. 20. Suppose the joints of a telescope were worked by a screw, or rack and pinion, would they or not still be telescopic?

A. They would be telescopic in the sense that they appertain to a telescope. They would not be telescopic as the term is ordinarily used. I understand a telescopic joint to be one which slides out and in freely.

X Q. 21. Then, if I understand you, the moment any appliance for working or controlling the action of a telescopic joint is attached to it, the joint becomes at once no longer telescopic. Is that what you mean?

A. I mean to say that any appliance which prevents it from sliding out and in freely, changes it from a telescopic joint to some other joint. The principle of a combination is its law of action; change the law, you change the principle. Any change that makes a telescopic joint cease to work freely, both out and in, makes out of it a new joint, no longer telescopic.

X Q. 22. Then, if I understand you, any device which regulates or controls the action of a telescopic joint renders it no longer a telescopic joint; is that what you mean?

A. If the device regulates or controls it in such a manner as to prevent its moving out and in freely, then the joint is taken out of the category of telescopic joints.

X Q. 23. Question repeated.

A. I mean if it controls it in such a manner as to prevent it moving out and in freely, that such device renders it no longer a telescopic joint. That is what I mean. A rack and pinion is not such a device. A rack and ratchet is such a device.

X Q. 24. Suppose, in the case last mentioned in your last answer, the the ratchet was thrown out of gear so that it did not engage with the rack, would it then be a telescopic joint?

250 A. If it could move freely in both directions, both out and in, it would be a telescopic joint. If it did not move freely both out and in it would not be a telescopic joint.

X Q. 25. Then, if I understand you, if the joint had been shoved in to its fullest extent so that it could be shoved in no further, or have been drawn out to its fullest extent so that it could be drawn out no further, it would not be a telescopic joint, is that what you mean?

A. I do not understand what you refer to by the joint. If you mean any telescopic joint, I will say that I am not particular about the arrangement of the two words "in" and "out." I mean by that, out and in as well as in and out. With this explanation, if a telescopic joint is pulled out as far as it can go, it must move in before it can move out

any more. If it is pushed in as far as it can go, it must of course be drawn out before it can be pushed in.

I will repeat, a telescopic joint is one that moves freely in and out, or out and in, as the case may be. A joint that can move only in one direction is not a telescopic joint in any proper sense of the term.

X Q. 26. Then, if I now understand your definition of a telescopic joint, the moment the pawls are disengaged from the racks in the upper section of what you call the frame, in Exhibit D, which is the enclosure within which the drills are intended to be worked, the joint between the upper and lower sections of this structure becomes telescopic, does it not?

A. If the upper section is by that device made to move out and in freely, it certainly would be a telescopic joint.

X Q. 27. Please examine the model Exhibit D, and then answer my last question categorically.

A. I think the joint could be moved in that case out and in, and in that case you may, perhaps, say that it is converted into a telescopic joint; but in making the conversion, a part and parcel of the actual joint in Exhibit D is practically obliterated.

251 X Q. 28. Then the joint between these two sections consist' in a combination with a telescopic joint of racks and pawls, does it not?

A. Certainly it does not. The joint in this case is a sliding joint, which I have termed an extension-joint, and consists of a sliding piece combined with a rack and pawls. The principle that governs it is the one I have already given—that is, it is determined by its law of action. The law of action in this case is, that the joint may be extended within certain limits, but it cannot be closed without resorting to a special device.

X Q. 29. Do you mean to say that if the rack and pawls were eliminated from the combination the joint would not be telescopic?

A. I mean to say that if the rack and pawls are eliminated the joint would cease to be what it is, an extension-joint.

(Answer objected to as irresponsive.)

X Q. 30. Question repeated.

A. I mean to say that it would not be the joint that it is. I do not mean anything else. As the joint now stands, it is not a telescopic joint. I think it is quite possible that you might fit that piece on with a telescopic joint, but in so doing we should have an entirely different combination from what we now have.

X Q. 31. Question repeated.

A. If I understand the question aright, it is as to whether taking away a part of a combination will convert it into some other combination. I think I have answered that question fully.

X Q. 32. Please to state definitely, "yes" or "no," whether if the rack and pawls were eliminated from the combination, the joint would be a telescopic joint?

A. I think it would.

Adjourned to Thursday, March 13, 1873, at 2.30 o'clock p. m.

252 NEW YORK, *March 13th*, 1873.

Met pursuant to adjournment.

Present, both counsel and the witness.

Cross-examination of Wm. G. Peck continued.

Answer to X Q. 32 continued:

A. I wish to add in continuation the words, technically but not practically.

X Q. 33. Why not practically?

A. Because if the pawls were removed, the upper section would fall down to its lowest position; and inasmuch as there are no provisions made for raising it up while the machine is in operation, it would not be any joint at all for practical purposes.

X Q. 34. But, as I understand your previous testimony, you stated that the joint would not be a telescopic joint because of the pawls and racks, which hold the parts temporarily in position in relation to each other. Now you say, substantially, if I understand you, that the joint would not be practically a telescopic joint when the pawls were thrown out of gear, because then there would be nothing to hold them in their proper relative positions. How is that?

A. My testimony is on record. I testified that it was not a telescopic joint for the reason that it had not free play. I now say that it would not be a telescopic joint under the hypothesis made, because it is practically no joint at all. That there may be no further misunderstanding on this question, I wish to state distinctly and emphatically that the joint in Exhibit D cannot by any hypothesis whatever become a telescopic joint, in the sense that the term is used in the specification of the plaintiffs' letters-patent, without making other hypotheses that would totally and radically destroy the instrument for the purposes it
253 was intended to accomplish, for the good and sufficient reason that the function or law of action of the upper section is totally different from that of any section or sections described in the plaintiffs' letters-patent.

X Q. 35. As I now understand you, you stated that the joint in Exhibit D was not a telescopic joint because it had not free play, which free play, as you said, was prevented by the racks and pawls; and now, then, that the hypothesis presented suggests that the pawls be thrown out of gear so that it has free play, you still say that, notwithstanding that it has free play, it would not be a telescopic joint practically. Will you please explain how, if is given free play, which you say is the only condition necessary to its being a telescopic joint, it happens that with this condition fulfilled it still remains an untelescopic joint?

A. The preamble of the question just proposed neither represents what I testified to nor the spirit of my testimony, but I waive my objection to answering the question on that ground, and once more say that the joint in question in Exhibit D is not a telescopic joint in any sense of the term, nor can it be made such by any hypothesis that does not totally defeat the end and aim of the machine represented in Exhibit D. I have stated that when the pawls are in position, as they must be when the instrument is in actual use, there is no possibility of an up and down motion such as would be implied by the term telescopic joint; and were there such motion, the instrument could not be used for the purpose of drilling. I have stated that when the pawls are removed, that the section will fall to its lowest position, and from the nature and construction of the machine, and from the position of the bridges when in operation, there are no possible arrangements or devices for giving the upper section an up-and-down motion such as that implied by the term telescopic joint. I say for all practical purposes in this case it is no joint at all; so that in either case it is not in any sense of the term the mechaicnal equivalent of the joint described in the plaintiffs' letters-patent.

254 X Q. 36. Then, if I now understand you, it is necessary, in order to form the telescopic joint described in the complainants' letters-patent, that there should be some means or device for preventing or re-

straining the free play of the telescopic joint; or, in other words, for holding the parts connected by that joint in their proper relative positions. Is that correct?

A. I do not understand what "is that correct" refers to.

X Q. 37. The words "is that correct" refer to the statement contained in the question.

A. The statement in the preamble is that the counsel understands, &c. I am unable to say whether he understands that or not. I will state, in order to remove any doubts, if such there be, as to my notion about a telescopic joint, particularly with respect to the joint described in the plaintiffs' letters-patent, that I regard the telescopic joint referred to as a joint having free play both in and out, and intended to play in that manner; that of necessity implies that it does at some time or other play in and out. This I regard as the function or law of action of the telescopic joint described in the plaintiffs' letters-patent. I need hardly add again that the joint spoken of in Exhibit D possesses no such function, is not intended to possess any such function, cannot be made to perform any such function, except by totally defeating the object of the machine.

X Q. 38. The witness is informed that when the counsel, now cross-examining, says he understands so and so, he means precisely that, and the question is repeated with a request for a categorical answer, confined entirely to the question presented.

(The counsel for the defendant desires to instruct the witness that he is under no necessity of receiving instructions from complainants' counsel relative to the answers to the questions proposed.)

255 (Counsel for complainant objects to the instruction just given to the witness by counsel for defendants as entirely improper, and calculated to influence the answer of the witness.)

A. If I understand the question correctly, it is an hypothetical one of such character that the hypothesis does not cover all the circumstances in the case. To such a question no categorical answer can be given. It only admits of a conditional answer. That answer, I think, I have fully given.

X Q. 39. State whether the understanding stated in cross-question 36 is or is not a correct understanding of your testimony.

A. I don't think it is.

X Q. 40. Then, if no device is necessary to prevent or restain the free play of the telescopic joint in order to constitute the telescopic joint described in complainants' letters-patent, how does it happen that when all the obstructions to free play are removed in Exhibit D it does not constitute a telescopic joint?

A. The joint in Exhibit D is not a telescopic joint, because it does not perform the functions of a telescopic joint. It was not intended to perform the functions of a telescopic joint. From the nature of the case it cannot be made to perform the functions of a telescopic joint. These reasons are sufficient, in my opinion, to show why the joint in Exhibit D is not a telescopic joint.

X Q. 41. Now, is not this the difference between the construction described in the complainants' letters-patent and the construction shown in Exhibit D, so far as the sliding telescopic or extension joint is concerned—that in the one one device is employed to keep the joint properly extended, and in the other another device is employed for that purpose, as you now understand said patent and model?

256 A. I commence my answer at the last end of the question, by remarking that I now understand both joints, as I did when I

commenced my testimony. I do not regard the difference as stated in the question as being the real difference between the two joints. The difference is radical and functional. The joint as it exists in Exhibit D is not constructed in the manner described in the plaintiffs' letters-patent, nor is it designed to perform the same functions; the two differ totally in principle. That there is a sliding motion in both, I suppose has never been denied; but that the manner of producing this sliding motion, and the object of producing it, in the two cases are completely different, can hardly fail to strike even the most casual observer. Scientifically speaking, there is not any mechanical equivalency between the two.

X Q. 42. What functions is this joint in Exhibit D designed to accomplish?

A. It is designed to hold the upper guide-plate of the drill-tubes firmly in a fixed position. Whether that position be above or below the surface of the water is of no consequence.

X Q. 43. I mean what function is that joint designed to accomplish?

A. It enables the engineer to regulate, to a certain extent, the distance between the upper and lower guides of the drill-tubes; but this regulation cannot be performed while the instrument is in use, nor is it intended that this guide-plate shall have any motion whatever during the use of the machine.

X Q. 44. Please examine more carefully the model Exhibit D, and state whether your last answer is correct.

A. The spirit of the answer is correct. I inadvertently used the words "lower guide-plate" in it. It enables the engineer to bring the lower end of the drill-tubes nearer to the rock, or to elevate them from it, as the case may be.

X Q. 45. That is all, is it?

257 A. The function of the joint is to permit the upper guide-plate of the drill-tubes to be elevated or depressed to suit his own convenience. That is all the function that I understand it to have.

X Q. 46. You say, substantially, that the cylindrical portion or upper section of the enclosure in which the drills are worked cannot be adjusted in the lower section; or, in other words, that the extension-joint, as you call it, cannot be operated while the machine is in operation. Please state why not.

A. When the machine is in operation the derricks that carry the windlasses and chains are of necessity turned away from the opening, and the bridges are let down and the drilling-engines mounted upon them. The absence of the hoisting-apparatus, together with the position of the bridges and machines, renders it impossible to operate the upper section during its use. At that time the boat or float and this frame, as I have termed it, are two objects as distinct from each other as this building and Trinity Church.

X Q. 47. Please look at the model Exhibit D more carefully and state, if you can, any reason why the derricks which carry the windlasses and chains cannot be swung back into place after the bridges are let down into position.

A. For the simple reason that it is a physical impossibility. When the bridges are down and the engines mounted, the derricks cannot be swung so as to produce a practicable hoist.

X Q. 48. Suppose derricks are swung into place before the engines are mounted, how then?

A. When the derricks are in a proper place to lift the upper section, the drilling engines cannot be mounted or operate.

258 X Q. 49. Is there any other reason why the extension-joint, as you call it, cannot be worked when the machine is in operation?

A. The reason I have assigned is that it is a physical impossibility; and that seems to require nothing additional in the way of a reason.

X Q. 50. Please look at the model, Exhibit D, and state if you find certain rings attached to the upper section or cylindrical portion of the enclosure which contains the drills.

A. There are such rings.

X Q. 51. What are those rings for?

A. They form points of attachment for the chains used to raise the upper joint when it is to be raised.

X Q. 52. Which chains are those?

A. They are the chains which pass over the windlasses and the pulleys at the end of the derrick.

X Q. 53. Now, then, suppose that during the operation of the machine, the derricks were in their hoisting position, the chains intended to connect with those rings were connected with them and drawn taut so as to support the upper section of the enclosure for the drills, and the pawls of which you have spoken were thrown out of gear, would or would not the joint between these upper and lower sections be a telescopic joint within the meaning of complainants' patent?

A. It would not.

X Q. 54. Please look now at the first claim of complainants' letters-patent, Exhibit A, and state whether it does not claim, in terms, "the construction and arrangement of a portable and adjustable dam in sliding or telescopic sections, in the manner and for the purposes herein described."

A. It does.

259 X Q. 55. Then, if the dam is constructed in sliding sections, is not that as much a fulfillment of the claim as if it was constructed in telescopic sections?

A. The word telescopic in the paragraph alluded to is expletive—intending to describe the manner of sliding. That this is the case is shown by the whole tenor of the document, and confirmed in the most emphatic manner by the model known as Exhibit E. Independent of this, the claim goes on to state that these telescopic sections, or the dam made of telescopic sections, is constructed in the manner and for the purposes herein described. I therefore think that such construction would not necessarily be a fulfillment of the conditions of the claim in the patent.

X Q. 56. But in order to justify this conclusion, the claim ought to read, "sliding and telescopic sections," instead of "sliding or telescopic sections," ought it not?

A. I don't undertake to decide how the claim ought to read. I interpret it as it does read. My interpretation has already been given.

X Q. 57. But if the intention of the claim was as you have stated in your answer to cross-question 55, would not the words "sliding and telescopic sections" have been a more natural expression of such intention than the words "sliding or telescopic sections?"

A. I do not undertake to give opinions as to the proper grammatical construction of the sentence in question. I take the sentence as I find it, and give my interpretation of its meaning. It is my belief that my interpretation expresses the true intent of the article in question. I give that as my opinion.

The further cross-examination of the witness is adjourned to Saturday, March 15th, at 11 o'clock a. m.

260 NEW YORK, *March* 15, 1873—11 o'clock a. m.

Present: Counsel for both parties.

JOHN G. FOSTER, a witness produced on the part of the defendants, being first duly sworn, in answer to interrogatories propounded by Mr. Davies, deposes and says:

Q. 1. What is your name, age, residence, and profession?

A. John G. Foster. I am forty-eight years of age. I reside at present at Washington, D. C. I am an officer of engineers in the United States Army.

Q. 2. Were you on duty in Boston Harbor in the year of 1867? And, if yea, state in what capacity.

A. I was ordered by the Engineer Department to take charge of the harbor improvements of Boston Harbor and of other harbors on the coast of Massachusetts in May, 1867. I arrived in Boston Harbor and assumed charge of the duties about the 28th of that month. I continued in charge of those duties until June, 1871.

Q. 3. During the summer of 1867, did you know one George W. Townsend, of Boston? And, if yea, state whether or not he was in your employ and in what work he was engaged.

A. I did know him, and in this way: I advertised for proposals for the removal of several dangerous rocks in the channel of Boston Harbor in June, 1867. Mr. George W. Townsend was one of the bidders for the contract, and I contracted with him, with the approval of the Engineer Department, to perform the work of removal, about July 10, 1867.

Q. 4. Did Mr. Townsend enter upon the discharge of the work so contracted for; and, if so, when, and in doing that work did he use any machine or apparatus for its performance?

261 A. He did commence the performance of his work under the contract on or about July 30, 1867. I witnessed the commencement, with others, and he used for drilling holes in the rock a new drilling-machine, gotten up by himself from his own ideas and suggestions made by me; said machine was designed especially for the kind of work we had on detached rocks lying wholly under water. The machine upon the first trial did not work well from a defect of construction of one of the parts; but this being remedied, in two or three days it worked perfectly, and continued to do so during the whole work of the removal of Tower Rock, Corwin Rock, Barrel Rock, and Kelley's Ledge.

Q. 5. Have you with you and will you produce a descriptive drawing of the machine so used by Mr. Townsend?

A. I have. I now produce a drawing marked "Foster No. 1, E. G. T., ex'r," showing the machine; and another drawing marked "Exhibit Foster No. 2, E. G. T., ex'r," showing its connection, attachments, and mode of operation.

Q. 6. How was the boat shown in the drawing, Exhibit Foster No. 2, secured in position during the operation of the machine?

A. The boat or sloop was moored by four mooring-lines, two running out from the bows on each side and two from the quarters, each mooring line making an angle of about forty-five degrees with the axis of the vessel. These lines were attached either to anchors or to the upper ends of mooring-buoys secured in position by mooring-anchors. The vessel thus secured was held as firmly in position as the yielding of the lines and the mooring-attachments would permit. It still, however, had some motion, caused by the wind and currents.

Q. 7. How was the machine, itself under water, held in position while in operation?

262 A. It was held in position at first by mooring-chains attached to one of the plates of the machine, and at the other end to anchors or to iron pins driven in holes drilled in the rock. The weight of the machine itself aided in preserving the stability of the machine while in motion under water, and subsequently this weight was so increased as to enable the machine to stand and be worked without the aid of the mooring-chains and anchors.

Q. 8. Describe the construction and use of the four legs upon which the machine appears in the drawing, Exhibit Foster No. 1, to be standing.

A. The drill-stand consists essentially of two parallel iron plates which were horizontal, one above the other, about four feet apart, connected by four uprights. The lower plate was supported by four legs which rested upon the rock. These legs were telescopic; each portion being about four feet long, consisting of a rod sliding into a cylinder, so that they could be made longer and shorter to suit the uneven surface of the rock. When fitted to the rock, or lengthened so as to touch the rock, they were fixed in that position by set-screws; the ends of the legs resting upon the rock were pointed and hardened.

Q. 9. In what way was the drill represented in that drawing operated?

A. The drill when in position was made to be nearly vertical, and to play up and down through holes in the two iron plates which served as guides for its motion.

The drill was intended to operate by its own weight; being raised a certain distance and allowed to fall, it cut the hole in the rock by force of gravity. The means for operating it consisted of a clutch, shown in the drawing, one end of which was forked to slide upon a spiral guide so as to turn the drill while it was being raised and trip the clutch at the proper heighth. The clutch was raised by an iron chain which passed through a hole in the upper plate and near the surface of the water was attached to a ballasted block, through which block a rope passed, one end of which was attached to the crank of a steam-
263 engine on board the working-vessel; and the other end of the rope was attached to a cleet on the side of the vessel, so that it might be taken in or paid out as the tide fell or rose.

The steam-engine being put in operation, at every revolution of the engine crank the rope would be drawn up and lowered, drawing up and lowering the chain one-half that distance, and drawing up the clutch and the drill-rod and allowing it to fall when tripped; thus at every revolution of the crank of the engine one blow of the drill was made in the rock.

Q. 10. By the engine mentioned in your last answer, you mean, do you not, the engine represented in the drawing Exhibit Foster No. 2?

A. Yes, the engine represented by the letter b, and referred to in the legend on the drawing.

Q. 11. In what way was this machine brought to or removed from the place where it was designed to be operated?

A. It was brought on board the working-vessel, shown in the drawing, and was lowered into position by a hoisting crane, marked *e* on the drawing, and in case of a removal it was hoisted out of the water by the same purchase and conveyed on the deck of the vessel.

Q. 12. Was or was not the use and operation of this machine a subject of notoriety and interest, and generally known to persons interested in work of this description during the summer and fall of 1867, at Boston Harbor?

(Objected to as leading and as calling for conclusions rather than the facts on wh ch such conclusions are based.)

Question withdrawn.

Q. 13. State what, if anything, you know regarding the publicity of the use of this machine during the summer and fall of 1867.

264 A. The operation of the removal of the rocks was an object of so much interest that I had constant application made to me to allow parties to go down on the steamer under my charge and witness the operation of drilling and blasting. I took down at different times the governor and council of the State of Massachusetts, the mayor and harbor committee of the city government, the members of the harbor committee of the legislature of the State, and the members of the board of harbor commissioners of the State of Massachusetts. Upon some of these visits reporters of the press were present and made popular reports to some of the city papers, referring to the novelty of the design by which the work was prosecuted, and the success attending its use; the whole of Tower Rock being removed with its assistance in about six weeks. Many other parties, besides those mentioned, visited the locality of the work at this time.

The whole operation excited a large share of public attention at the time, as the removal of these dangerous rocks, which were great obstacles to navigation, seemed assured by the work in progress.

On being cross-examined by Mr. How, says:

X Q. 14. Please look at the book now shown marked "Exhibit Foster No. 3," and state whether you are the author of it.

A. I am.

X Q. 15. Is that a correct and true description of the drilling-machine of which you have testified as having been used in Boston Harbor, and a true and correct statement of its operations and the circumstances connected therewith?

A. The drilling-machine that I have described in my testimony was the first one used in Boston Harbor and at the time I have described. The machine shown on plate 3 of this book was another machine similar in all respects except in some details of construction which was made 265 afterwards and used afterwards; several machines were built at different times and used upon the works. I think the first machine was destroyed by a vessel running over it and tearing it to pieces.

X Q. 16. On what rocks was the machine represented in plate 3, as you have stated, used?

A. It was used on Corwin Rock.

X Q. 17. Any other?

A. I do not recollect. This or similar machines were afterwards used upon Barrell Rock and Kelley's Ledge.

X Q. 18. Then it was not used on Tower Rock, was it?

A. I am not sure whether it was or not. The second machine was built very soon after work was begun on Tower Rock. Whether this machine was used on Tower Rock I cannot now recollect.

J. G. FOSTER,
Lieut. Col. of Eng's, and Brevet Maj. Gen. U. S. A.

Sworn and subscribed to before me this 15th day of March, 1873.

G. IRVINE WHITEHEAD,
Special Examiner.

The cross-examination of William G. Peck continued by Mr. How:

X Q. 58. You have stated, if I understand you correctly, that a tele-

scopic joint was a joint that had free play in and out; please state whether the ordinary opera-glass joint is a telescopic joint, I mean the joints formed between the tube which contains the object-glass and the tube which contains the eye-glass.

A. I think it would be a telescopic joint.

X Q. 59. Please look at the opera-glass now shown you and state
266 whether or not the joints between the tubes which contain the object-glasses and the tubes which contain the eye-glasses are telescopic joints?

A. I think they are.

(Opera-glass referred to in the last question and answer is here offered in evidence by complainants counsel, and the same is marked "Exhibit Peck No. 1, G. I. W., S. Ex'r.")

X Q. 60. But it has nevertheless a device for securing the parts in position relative to each other, has it not?

A. I don't think it has.

X Q. 61. Does it not have a device which prevents the free movement of the joint?

A. I see no such device. The device alluded to is the common one employed in such instruments for enabling the person using it to move it out and in freely. That device is equivalent to the rack and pinion sometimes employed; it does not affect the character of the joint.

X Q. 62. What do you understand that device to be in Exhibit Peck No. 1?

A. I cannot tell exactly without taking the instrument apart, but it is probably a rapid screw and nut, such as is used for driving-wheels, or for being driven by wheels.

X Q. 63. Where have you ever seen such a screw driven by wheels?

A. I have such a one in my mechanical collection of models, which I always exhibit to my class when lecturing on the subject of what we term the endless screw.

X Q. 64. Please look at figure 8, section of plate 4, of Exhibit Foster No. 3, and state whether the joint there shown is a telescopic joint.

A. When unclamped, it undoubtedly is a telescopic joint; when clamped, it is practically no joint at all.

267 X Q. 65. Then, if you withdraw the set-screw, which clamps the joint, you have a telescopic joint, do you?

A. You have a telescopic joint; I think so.

X Q. 66. Returning now to Exhibit D, state in what respect the joint between the upper and lower sections of the enclosure for the drills differs, when the pawls are thrown out of gear, from the point referred to in the last question, and answer in respect to being telescopic.

A. When the pawls are thrown out of gear the upper section of that frame falls to its lowest limit. There is then no connection between it and the rest of the machine that permits it to be drawn out and in at pleasure, and it practically ceases to be a point at all. In the case alluded to in Exhibit Foster No. 3, the upper extremity of the sliding piece is attached to the horizontal plate, so that when that plate is swayed to and fro, as it is in adjusting the instrument for use, there is a free play both out and in. In this case the combination performs the function of a telescopic joint, in the former case it does not. The difference is functional.

X Q. 67. In Exhibit D, the only weight tending to slide the upper section down to its lowest position is the weight of that section itself, while in the case alluded to, in Exhibit Foster No. 3, there is additional weight

of the plates and frame-work above added to the weight of the upper section. Is not that the case?

A. It is when that weight is thrown upon the sliding-piece, which may or may not happen.

X Q. 68. In Exhibit Foster No. 3, is not that the weight intended to be thrown upon the upper section?

A. I take it that all the weight is not intended to be thrown upon it until the plate is leveled and the joint clamped. The instrument is let down from the vessel by means of a derrick or derricks, and is supported by the chains in an approximate position, until the level-
268 ing legs (one of which is under discussion) are adjusted and clamped (the screw driven home so as to make the joint fast, make the joint one piece.)

X Q. 69. Then, if I now understand you, the upper section of the telescopic joint referred to in Exhibit Foster No. 3 is intended to be held up by the lowering device till the joint is secured so that it cannot move further; is that correct?

A. The weight of the machine is probably not all thrown upon the leveling legs until they are adjusted and clamped. The whole machine is partially suspended, certainly, till this operation is complete. That a portion of the weight may be thrown upon the upper joint as the instrument is swayed to and fro in leveling the plates is undoubtedly the intent and design of the combination.

X Q. 70. Please answer my last preceding question categorically, yes or no.

A. It is so held up, substantially.

X Q. 71. Please state how, in this respect, it differs from the joint between the upper and lower sections of the enclosure for the drills in Exhibit D.

A. It differs in this way: In Exhibit Foster No. 3 the joint, until clamped, has free play out and in. In Exhibit D there is no such freedom of motion. The former is a telescopic joint in its intent and in its functions; the latter not.

X Q. 72. In Exhibit D, though, the joint has free play out and in till it is clamped or secured by the pawls, in the same way that the joint referred to in Exhibit Foster No. 3 has free play till it is clamped or secured by the set-screws, does it not?

A. The joint in Exhibit D has never, under any circumstances, free play out and in when in use. In fact, it has no play at all when in use, and can have none. No hypothesis can make that joint the mechanical equivalent of the one referred to in Exhibit Foster No. 3.

269 X Q. 73. Has the joint referred to in Exhibit Foster No. 3 ever any play out and in when in use?

A. I am unable to say whether the inventor of that combination intended any such free play, but I see no physical reason why it might not be leveled. My impression, however, is that such was not the design of the inventor. I perhaps ought to say that if one of the leveling legs is found not to have a firm bearing on the bottom, that I see no reason why it might not be brought into contact with the rock below and clamped at any time.

X Q. 74. Then, if the telescopic joint referred to in Exhibit Foster No. 3 is not intended to be adjusted when in use, how does it differ from the joint referred to in your testimony in Exhibit D in that respect?

A. I don't understand exactly the nature of the question. If the intention is to inquire whether either of them has motion when both are fixed, I can say in this respect (and in this only, so far as I can see)

there is no difference. I do not wish to be understood as expressing the opinion that the hypothesis made is in any way connected with the nature of either joint.

X Q. 75. Question repeated.

A. I don't see how to give any other answer.

X Q. 76. You don't see, then, how, under those conditions, they differ in any respect, do you?

A. I don't see that those conditions affect the nature of either joint in the least degree.

X Q. 77. Suppose a telescope was set upon the end, containing the object-glass, and the points fitted freely, so that they would move without material friction, what would be the result as regards the joints?

A. They probably would close up. It would be a pretty poor telescope.

X Q. 78. It would be a telescope, nevertheless, would it not?

270 A. I think it would.

X Q. 79. In that respect it would be precisely the same as Exhibit D when the pawls were thrown out of gear, would it not?

A. No, I don't think it would.

X Q. 80. Why not, or how otherwise?

A. The two joints would differ in the functions they were intended to perform. In the case of the telescope the joint is intended to move out and in freely, and the device embraces necessary facilities for this motion. In Exhibit D the joint is not intended to move out and in, and it does not offer the facilities and device for that motion. The hypothesis made does not in any way affect the functional character of either joint.

I wish to add here that the hypothesis made so many times during this examination, that the pawls can be obliterated at pleasure, is one that can only be carried into effect by defeating the intention of the joint in question.

X Q. 81. Then they do operate in the same way under the hypothesis suggested, do they not?

(The witness is requested to confine his answer to the question and omit his argument, so often repeated, about defeating the functions of the joint in question.)

(Defendants counsel instructs the witness, as on a previous occasion, that he is under no legal obligation to receive instructions from plaintiffs counsel relative to his answers to the questions proposed.)

(Plaintiffs counsel replies that he claims to be entitled to a direct and sufficient answer to the question proposed, as direct and specific as it is possible for the witness to give, and that it is the duty of the witness to answer the question as directly as possible, and without adding arguments or suggestions on other points not called for by the question.)

271 A. Under the hypothesis suggested, they do not operate at all.

With respect to the form of answer, I wish to say that nothing is further from my intention than not to answer questions as directly as possible. But when questions are made hypothetical and the hypothesis but a partial one, I must, from the nature of the case, give a conditional answer; otherwise the answer given might be liable to perversion.

X Q. 82. Then, under the hypothesis there stated in the question, the joints of a telescope and the joint in Exhibit D would be precisely alike, so far as operation is concerned, would they not?

A. They certainly would not be alike. In one case the means for operating the joint exist. In the other they do not.

X Q. 83. But the joint would be the same, irrespective of the means of operating in both cases, would it not?

A. As I have said before, there would be no joint, in any practical sense of the term, in either case. No logical deduction can follow from a comparison of two negative hypotheses of the character mentioned.

X Q. 84. Question repeated and a definite answer requested.

(Objected to, as the question has already been answered.)

A. The first hypothesis involved in the question leads to the conclusion that the first joint is practically no joint at all. The second hypothesis leads to the conclusion that the second joint would be no joint at all. The only inference that I can draw from these hypotheses is that neither of them effect the question of the relative character of the joints.

X Q. 85. Well, then, under the hypotheses last stated in ques-
272 tion, both joints taken irrespectively of the means of operation, or, in other words, the joints themselves without any reference to the means of operation, would be precisely the same, would they not?

A. I have just stated that no such deduction can be drawn from those two hypotheses. The fact that two joints can be thrown into a position where both are practically null, so far as function is concerned, leads to no conclusion as to the relative character of the joints.

X Q. 86. Then, do you mean to say that under the hypothesis last stated in question, the two joints mentioned in that hypothesis would be substantially different from each other?

A. No such conclusion would follow from the hypotheses. The hypotheses would show nothing whatever with respect to the nature of the joints, whether they are alike or unlike.

X Q. 87. Do you mean to say that you cannot tell whether, under the hypotheses stated in the question, the joints are alike or unlike?

A. No inference with respect to the character of the joints can be deduced from the hypothesis stated any more than from the hypotheses that both were made of brass.

X Q. 88. Under the hypothesis last stated in question, can you see any substantial difference between the two joints?

A. I can.

X Q. 89. State what.

A. I can see that one is intended to perform the functions of a telescopic joint, and the other is not. This I conceive to be a substantial difference.

X Q. 90. I do not ask what you may conceive some person's inten-
tions to have been in regard to these two joints, but I ask what
273 substantial difference you find between the joints themselves under the hypothesis stated, and as stated in the hypotheses, irrespective of the means of operation.

A. I do not see that any conclusion can be drawn from the hypothesis made with respect to the nature of the joints. I decide upon the nature of the joint from all the circumstances growing out of the combination; that is, by its law of action. I can give no opinion as to the nature of a joint in any other way.

X Q. 91. Then, to be brief about it, you cannot state any difference which would exist between the two joints, under the hypothesis last stated in question. Is that correct?

A. It hardly corresponds to the answer I have given so many times, viz, that no conclusion as to the nature of the joints can be deduced from those hypotheses.

X Q. 92. Well, then, if you can state any substantial difference between the two joints under those hypotheses, please do so; if you cannot, please say so.

A. I am unable to draw any inference whatever as to the nature of

the joints from those two hypotheses; neither of them has anything whatever to do with the mechanical character of either joint.

X Q. 93. Are you able to understand the character of the joints in the two cases presented by the hypothesis, viz, a telescope set on the end, containing the object-glass, and the joints being fitted so as to move substantially without friction in the one case, and the enclosure for drills in Exhibit D, with the pawls th'own out of gear in the other case, sufficiently well to say whether they are alike in the respect that if sufficient hoisting power and force be applied in either case to the upper section both joints are alike or unlike in that they may be extended by such hoisting power, or, in other words, that the section above will be drawn up through or in the joint in the one below?

274 A. The upper section will be drawn up, undoubtedly, in both cases.

X Q. 94. Then, if both were lowered, would they not both slide down in the same way?

A. They would.

X Q. 95. Are not the pawls, in Exhibit D, intended to be thrown out of gear when occasion requires?

A. They are, but never when the instrument is in use, or after it goes into the water.

X Q. 96. What is the object of the extension joint which you have described in Exhibit D?

A. It is to enable the engineer, at leisure, to increase the distance between the rock at the bottom and the upper plate of the frame which carries the drill-tubes. Its object, also, is to give a firm and immovable position to the drill-tubes. The object of the extension-joint is to accomplish the former; the object of the piece is to accomplish the latter effect.

Adjourned to Wednesday, March 19, 1873, at 2 o'clock p. m.

NEW YORK, *March 19th*, 1873—2 o'clock p. m.

Met pursuant to adjournment.

Present: Counsel for both parties, and the witness, Wm. G. Peck, whose cross-examination is continued by Mr. How, as follows:

X Q. 97. Please state in what respect the enclosure, in which the drills are worked in Exhibit D, is not a dam to the same extent as that shown in the complainants' patent, and in substantially the same way?

275 A. The enclosure, so called, in Exhibit D does not go to the bottom of the water, nor does it rise to the top. To prove that it does not rise to the top, it will be sufficient to state that if the instrument is set at low water, and coming as high as the bridge will permit, the ordinary tides in the neighborhood of the city of New York will of necessity rise and cover it completely at high water. This is the most favorable hypothesis that can be made to show that it is a dam at all.

I may add that, after the instrument is once set, there is no possibility of increasing its height except by ceasing to work, throwing back the bridges and raising the whole machine, as a unit, bodily up from the bottom. In plaintiffs' patent, express provision is made for elongating the dam in a vertical direction, as the tide rises.

X Q. 98. How far above the deck of the boat or support, in the machine represented by Exhibit D, do you understand the bridges to be set?

A. At the highest point, the bridge, as near as I can measure it in the

model, is about a foot and a quarter above the level of the deck. If we take from that the distance that the ties (represented by the iron wires) are below the bridges at the highest point, which is about nine inches, as near as I can measure it, we shall have the practical clearance of the bridge above the deck not more than six inches.

X Q. 99. What is the distance between the bottom of the boat or support and the deck thereof, in the machine represented by Exhibit D?

A. About nine feet.

X Q. 100. What is the draught of the boat or float of the machine represented by Exhibit D?

A. That is a question that I cannot answer from personal knowledge. Judging from the nature of the machine, and from what I have been able to gather by study and conference, I think it will average about four feet and a half when heavily loaded—perhaps a little
276 more. My answers are based on the hypothesis that it draws about four feet and a half of water.

X Q. 101. What is the average or mean difference between high and low tide in the harbor of New York?

A. In different parts of the surrounding water the tides range from four or five feet up to seven.

X Q. 102. Then, if the upper section of the enclosure containing the drills, in the machine represented by Exhibit D, were drawn up, at low tide, as far as the bridges would allow it to come, and the variations of the tide were only four or five feet, it would remain above the surface of the water, or at least not be submerged at high tide, would it not?

A. It would not. The highest line of the drill-frame—the upper section of the frame referred to—must be at least four feet below the lowest part of the bridge in order to permit the working of the drill-engines, which project to that distance below the lowest part of the bridge. The minimum height*h*, then, that the upper ring could occupy, with respect to the surface of the water at its lowest level, could not possibly be equal to one foot. Taking the case of spring-tide, which exceeds seven feet, I think, a little, the whole frame would be submerged, at high water, about six feet. In making this estimate I have not allowed any play to speak of between the bottom of the drill-engines and the upper ring or plate of the drill-frame. To work the instrument advantageously the whole frame must be submerged at the very lowest water, as it is in the instrument represented in the drawings, Exhibits Foster, Nos. 1 and 2.

X Q. 103. But suppose that the removable engines for working the drills, which are enclosed in the upper section, were left off, and only the drills in the lower section and outside the upper section were worked, or that the connections below those inner engines were shortened so as not to extend below the bridges; how then?

A. Even then it would be submerged at high water.

277 X Q. 104. How do you make that out in four or five feet rise of tide, only, when, according to your own figures, there is at least five feet between the bridges and the surface of the water at low tide?

A. As some tides rise to the height*h* of seven feet, and since the height*h* of the upper rim, even if jammed up against the bottom of the bridge, cannot possibly be more than five feet, even by my own figures, above the water, those figures show, still, a surplus of two feet of water, at spring-tide, flowing over the top of the frame. But in a former part of my testimony I stated, and now repeat, that it is impossible to moor a floating scow so that it will not rise and fall and drift to and fro under the action of the waves and currents. To protect the frame, therefore, from absolute destruction, or the bridge, as the case may be, a certain

amount of play must be allowed. That will certainly give a surplusage of water flowing over the top of the frame, even at the lowest high water.

X Q. 105. Suppose the rise of the tide was only four feet, how then?

A. Even then, I think that no engineer who understood his profession would set the frame so that there would not be a surplusage of water flowing over it at the very lowest of high tides. In a word, I do not think that any hypothesis, compatible with the practical working of the machine, would prevent the water flowing over it at high tide. I may say that the hypothesis under which I am called to give my opinion of this machine is an extreme and an improbable one, and, as I have said before, no general conclusions can be drawn from a limiting hypothesis.

X Q. 106. But if the upper section of the enclosure for the drills were set as high as it would bear, under the hypothesis last stated, it would afford protection and prevent the current from flowing over its top at low tide, and for a considerable portion of the rise of the tide, would it not?

278 A. I do not understand what is intended by the term "affording protection." No protection is needed of the kind alluded to, as is shown in the machine represented in Exhibits Foster, Nos. 1 and 2. If the section, perchance, rises above the surface of the water at any stage of the tide, it would certainly prevent the current from flowing in at the top.

X Q. 107. Question repeated and an answer requested.

A. Answer repeated.

X Q. 108. Is that the only answer you can give to the question?

A. No; it is not the only one, but it is the only one that answers the question in its spirit.

I can add that the upper portion of the drill-frame (and by the drill-frame I mean that part of the machine represented in Exhibit D by the hemispherical dome, and the cylindrical portion extending from the top of the dome, to and including the upper plate for supporting the drill-rods) is not intended to protect the interior of it from the action of the currents. If it does so it is purely incidental, and is no part of the function of the machine.

X Q. 109. Please answer cross-question 106 categorically, yes or no.

A. No. I wish to add that, *that*, under average circumstances, the state of affairs supposed in the hypothesis would not last for a considerable portion of the tide.

X Q. 110. Why do you say that the lower section of the enclosure for the drills in Exhibit D does not extend to the bottom of the water?

A. The circumstances under which such a machine is used imply a rough and rocky bottom. The intention of the machine is to place the drills in a vertical position, or substantially so. This requires the lower hemispherical ring of the dome to be made essentially level, and leveling-legs similar to those used in leveling other instruments of the

279 kind, as shown in Exhibits Foster Nos. 1 and 2, are provided for the purpose. Therefore, if the bottom is not level and the lower rim of the drill-frame is level, the frame will not rest on the bottom except through the medium of its leveling-legs.

I did not intend to say that the ends of these legs would not rest on the bottom, but that the lower part of the enclosed dome, as you call it, would not rest on the bottom.

X Q. 111. Suppose the dome were allowed to take whatever inclination the rock would give it, how then with regard to its reaching the bottom of the water?

A. The hypothesis would permit a good many degrees of inclination; if the inclination were considerable, the drill-tubes would be so far out of the vertical that the machine could not be worked. At any rate, on a rough bottom, it would hardly be likely to touch in more than three points; if it touched in more it would be probably an accident. So, even in this case, there might be very considerable intervals between portions of the rim and rock, inasmuch as the entire diameter of this dome is thirty feet.

(So much of the last answer as refers to the working of the drills is objected to by complainants' counsel as irresponsive, and the witness is requested, hereafter, to confine his answers to the questions asked.)

X Q. 112. How, then, in respect to reaching the bottom of the water, would it differ substantially from the still-water dam described in complainants' patent?

A. In this respect alone I don't think there would be any great difference between the two. I have already said that I don't regard the model called Exhibit E as a dam, and for this reason, amongst others.

X Q. 113. And the enclosure for the drills in Exhibit D would check the force of the current, and so far up and down as they extended, or nearly so, would protect the drills from the force of the current,
280 either wholly or partially, and also in like manner protect the divers, would it not?

A. I cannot answer this question from direct experience, but I have been informed, and believe from my general knowledge of hydro-dynamics, that the action of the currents flowing through the interstices beneath the dome rather increase the difficulties the diver has to contend with. As to the drills, the same answer as before; they require no protection.

X Q. 114. You have spoken of the dome and cylindrical tube, which form the enclosure containing the drills, as a "frame." Why do you call it a frame instead of an enclosure, which it evidently is?

A. I called it a frame because it performs the functions of a frame, which in this case is to support the drill-tubes. I do not call it an enclosure, because it is not an enclosure, being open, practically, both at bottom and top, and in all cases, when in use, the top being totally submerged.

X Q. 115. Are the functions of a frame to support the drill-tubes all the functions which are performed by these parts?

A. The dome, in addition to forming an essential part of the frame, is devised, also, to utilize a very large portion of the pressure due to the flowing currents that impinge upon it to impart stability to the whole machine. Now, the function of a frame is to give stability to the structure built upon it. In an indirect sense, then, we may say that even the latter function is tributary to the main function of the frame. The function of the upper part is to give a longer length to the guides or drill-tubes, should the case demand it, than the radius of the dome. In this way the cylindrical portion virtually increases the practical radius of the dome to the extent of its altitude, by which I mean, were the frame composed of a dome alone, to obtain an altitude of twenty feet for the drill-tubes would require the dome to be forty feet in diameter.
281 I believe that is all the function I think of now; there may be other functions.

X Q. 116. Please look at Exhibit D again, and see if there are not certain hooks attached to the under side of the bridges, and state what they are for.

A. They are to hook the tie-rods together. I now have hooked them

together. It will be observed that there is a swivel by means of which the tie-rod can be rendered more tense, an essential condition to the stability of the bridges from which the engines work.

X Q. 117. Then if the only object or use by the enclosure for the drills in Exhibit D is to furnish a frame for drill-tubes, can you give any reasonable explanation why both the upper and lower sections should have been made an entire enclosure on all four sides, at great additional expense, and involving vastly greater resistance to the current, instead of being made an open skeleton-frame, which could have been done at much less cost, and would have offered scarcely any resistance to the current?

A. The reason for making the lower portion in a hemispherical form is that it gives a maximum amount of stability with a minimum developement of surface and expense. No other form could have been devised that would have accomplished this result. With regard to the upper section, the circular form affords a maximum amount of room with a minimum amount of material. I am yet to learn that any other form of frame would meet the exigencies of this case in a more economical manner. I do not think that the close character of the upper section is at all essential, or even necessary. An open frame would have answered just as well, but it would not have been as stable, or have afforded as much working-room, which is a very important point in this case.

X Q. 118. Supposing the sliding legs, as you call them, in Ex-
282 hibit D were left unclamped, would they or not differ in their character, functions, and mode of operation from the self-anchors 3.3. described in complainants' patent?

A. In the first place, the sliding legs could not be left unclamped, for the reason that they clamp themselves, permitting the leveling-legs to slide downwards but not upwards. The arrangement that effects this is the same as that which prevents the car of an elevator, in certain cases, from running down when the hoisting-rope breaks. Even if the supposition could be made, they would not and could not perform the function of self-anchors, for the reason that the resultant of all the forces, including the weight and the force of the current, would pass within the polygon of support, and, therefore, any lateral drift of the machine would be an impossibility. And if no lateral drift could take place, there could be no such thing as self-anchoring in the sense of the term employed in the complainants' letters-patent.

X Q. 119. Compare the portability of the enclosure for the drills constructed, as shown in Exhibit D, with the portability of an enclosure for the drills of the same working capacity constructed in the form shown in Exhibit E.

A. By the term portability I understand facility in maneuvering, including transportation from place to place, and the like.

First, to raise the drill-frame of the machine represented by Exhibit D the bridges have to be raised, the two halves being uncoupled by disconnecting the swivel-joints of the tie-rods, and then raised by the proper hoisting-apparatus, after which the derricks or frames are thrown into working position, the dome-chains let out and attached to the dome, and then the whole machine lifted bodily against the vertical component of the pressure of the stream until the whole machine is high enough to clear any obstruction on the bottom. The diver then has to go down and unclamp the leveling-legs, or else the machine has to be swung high enough so that the leveling-legs can clear the bottom, after which, by suitably loosening and tightening the mooring-chains, the machine may be drifted into a new position.

283 To accomplish the same end in the machine represented by

Exhibit E, the chains which are attached to the eyebolts of the lower section have simply to be wound upon their windlasses until that section is raised sufficiently far from the bottom to permit it to clear the obstructions; that is, to permit the self-anchors, which will then fall down to their lowest limit, to clear the bottom; after which the operation of changing position will be essentially the same as in the other machine.

With regard to the force necessary to exert in these cases, that applied in the machine represented by Exhibit D is equal to the weight of the entire frame, (many tons,) together with the normal force of the pressure of the current; a varying quantity, but always counted by tons.

In the machine represented by Exhibit E the force exerted will be necessary to raise all the sections of the telescopic portion, except those that hang suspended directly from the frame on the deck.

Comparing the whole operation and the force exerted in the two cases, I think I may safely say that the instrument represented in Exhibit D is not a very portable machine, whereas that represented by Exhibit E is much more so.

X Q. 120. Then, if I understand your last answer, it may be summed up in this way; that both machines are portable, but that the machine represented by Exhibit E is a great deal better in that respect than the machine represented by Exhibit D; is that correct?

A. The term portable admits of a good many grades of meaning. Houses are sometimes moved bodily, and are portable in one sense. In that sense, certainly, both these machines are portable. If I understand by the term "better in that respect," more portable, my answer is yes. More portable, but not more stable.

X Q. 121. Well, in the sense of being intended for and adapted
284 to being removed from place to place, to perform the different operations required, both these machines are portable, are they not?

A. They are, in that sense.

WILLIAM G. PECK.

The redirect examination of the witness is adjourned to Saturday, March 22d, 1873.

NEW YORK, *March* 22, 1873—11 o'clock a. m.

Met pursuant to adjournment.

Present: Counsel for both parties, and the witness, Wm. G. Peck, who, being examined on the redirect examination, says:

R. D. Q. 122. On your cross-examination you stated that the upper section of the frame or support for the drills could not be raised or lowered while the machine was in operation. Give your reasons for such statement.

(Objected to as already fully answered.)

A. The derrick chains, represented in the model Exhibit D in brass, are not sufficiently long when let out to their fullest extent to reach even to the level of the deck of the scow. Even were they long enough to reach the drill-frame when in use, it would be necessary for them to pass through the interval between the bridges, and then to extend obliquely under the bridges to their proper points of attachment in the upper section of the drill-frame. As the upper section of the drill-frame weighs something over two tons, any attempt to exert a force upon the chains thus arranged would rupture either the chains or the bridge.

Furthermore, if the derrick-chains spoken of were made taut, the drift of the boat, without any active force being thrown on the chains, would, in my opinion, destroy either the bridge or the chains without raising the upper section.

285 R. D. Q. 123. What effect, if any, would the hypothesis suggested in the cross-examination, of the obliteration of the racks and ratchets in the extension-joint of the support for the drill-tubes, have upon the motion of that joint?

(Same objection.)

A. It would have no effect whatever, as the joint is not intended to move while the instrument is in use. It makes no difference in the character of that joint whether it is held in position through the intervention of the racks and ratchets or by the flange of the upper section upon which it would rest were the racks and ratchets taken away. In both cases the section referred to would have and maintain a stable position.

R. D. Q. 124. For what purpose is the device that is moved by the ratchet-wheel in Exhibit Peck No. 1 designed?

A. It is designed to move the telescopic sections, which carry the eye-pieces, freely both out and in or in and out. It is not intended for any other purpose.

R. D. Q. 125. Is there any necessity, in a machine designed for submarine drilling through the use of drill-tubes, of any device other than the tubes for the protection of the drills against the action of the currents?

A. The drill-tubes afford all necessary protection to the drills against the action of currents. No other device is necessary to protect them. All that is required is that these drill-tubes should be held in a steady and fixed position by a rigid and stable frame, as is illustrated in the machine represented in the drawings Exhibits Foster Nos. 1 and 2.

WILLIAM G. PECK.

Sworn and subscribed to before me this 22d day of March, 1873.

G. IRVINE WHITEHEAD,
Special Examiner.

Examination adjourned to Wednesday, March 26, 1873, at 11 o'clock a. m.

286 NEW YORK, *March* 26, 1873—11 o'clock a. m.

Met pursuant to adjournment.

Present: Counsel for both parties.

WILLIAM L. QUINN, a witness on the part of the defendants, being produced and duly sworn, in answer to interrogatories propounded by Mr. Davies, says:

Q. 1. What is your name, age, residence, and occupation?

A. William L. Quinn. I am twenty-nine years of age. I reside at No. 293 Gold street, Brooklyn. I am a submarine diver by occupation.

Q. 2. Are you one of the defendants in this action?

A. I am.

Q. 3. Have you been employed on the steam-drilling scow represented in Exhibit D? And, if so, state whether such employment was continuous, for what period you were employed, and in what capacity.

A. I was employed on the steam-drilling scow referred to. My occu-

pation on it was continuous from 1870 to 1872. I was employed as a submarine diver.

Q. 4. At what time in 1870 did your employment begin, and what time in 1872 did such employment cease?

A. November 7, 1870, and October 3, 1872.

Q. 5. State what work was done with the said steam-drilling scow during the time the same was put in operation in the fall of 1870.

A. Well, we drilled some rocks. We drilled part of two sets of holes.

Q. 6. During the operations conducted in the fall of 1870 was any attempt made to raise or lower the upper section of the dome represented in Exhibit D?

287 A. It was raised once, in 1870.

Q. 7. Under whose orders was that done?

A. The superintendent's, Mr. Pierce.

Q. 8. Was it lowered after that?

A. It was tried to be lowered, but we couldn't get it down.

Q. 9. State how and in what manner the attempt at lowering of which you speak was made.

A. By getting inside and hammering the pawls that were there inside to hold it. We hammered them with handspikes and mawls—when it was up out of water.

Q. 10. During the period of your connection with the operations of this machine, was any other attempt at any time ever made to raise or lower this upper section, or was it ever raised or lowered?

A. There was no attempt made to raise it—we tried to get it down. We tried to pull it down.

Q. 11. How was that attempt to pull it down made, and what was the result of such attempt, if any?

A. By putting tackles in the inside and trying to haul it down with tackles. It wouldn't come down.

Q. 12. During the operations of 1872, what was the relative condition of the upper and lower sections of this dome with reference to their capacity of movement—the one within the other?

(Objected to on the ground that Exhibit D, made by defendants and put in evidence in this case, is stipulated to fairly represent the machine as used by the defendants, and it is not competent for the defendants to now contradict this exhibit and the stipulation above referred to.)

A. In 1872 it smashed up. I don't understand what the question means.

288 (Counsel for defendant explains to the witness that by the question he desires to know whether or not the upper section could, during the period stated, be lowered into or raised out of the lower section.)

(Counsel for complainant objects as before.)

(The witness continues his answer as follows:)

It couldn't be lowered into the lower section—it couldn't be taken out of it, because we took it out and put it on deck; but it couldn't be put down into it.

Q. 13. When was this taken out—when the machine was in operation or when it was laid up?

A. When it was laid up.

Q. 14. Now answer question 12: understanding that the question refers to the time when the machine was in operation.

(Same objection continued.)

A. In 1872 it was smashed up, so it couldn't be lowered.

Q. 15. You have worked as a diver within this dome or dam, have you not?

A. Yes, sir.

Q. 16. What effect, if any, did this dome produce in facilitating your work as a diver during the running of the tides?

A. Running tide, the tide runs strongest in there than it does outside. You can't work there any more than you can outside—not at the bottom of it.

Q. 17. In removing rock from reefs in the harbor, was work in any other place required from you than at the bottom?

A. No, sir; sometimes outside of it, to hook it on. The work was all on the bottom of it—on the rock itself.

289 Q. 18. When and where was this attempt made to pull down this upper section by means of tackles, that you have spoken of in your answer to question 11?

A. At Greenpoint, where we put it in—when we put it off the deck.

Q. 19. Was the machine working or in operation at that time?

A. No, sir; she was laid up, getting ready for operations.

Q. 20. Have you any memoranda with you of your work in connection with this machine by reference to which you can ascertain the dates of the operations of the machine and the work done?

A. I got the dates when I went on the reef and when I came off the reef—some of them.

Q. 21. Could you, by reference to such memoranda, ascertain the date at which the upper section was raised or lowered, as you have described in your answer to questions 6 and 9?

A. I couldn't tell the date exactly when it was raised and when it was undertook to be lowered down. I can tell when I went on the reefs and when I came off the reefs. It was between the time that I went on and I came off that it was done, but I can't tell the dates.

Q. 22. Give the times at which you came on the reef and went off the reef, between which times you say this raising and attempt at lowering was made.

A. November 19, 1870, I came on the reef, and laid up January 6, 1871.

Q. 23. Was the machine in operation at the time this upper section was raised?

A. She wasn't working; she was laying at anchor.

290 (The witness desires to make a correction in one of his answers, and says:)

It was in 1871 when the cylinder was moved. It was raised up. I saw myself that I had made a mistake in the year.

WM. LAWRENCE QUINN.

Sworn and subscribed to before me this 26th day of March, 1873.

G. IRVINE WHITEHEAD,
Special Examiner.

SAMUEL LEWIS, a witness called on the part of the defendants, being duly sworn, in answer to interrogatories propounded by Mr. Davies, says:

Q. 1. Look at that certified copy of letters-patent now shown you, and state whether you are the Samuel Lewis therein referred to.

(Objected to as immaterial and irrelevant to the issue.)

A. I am.

(Counsel for defendants puts in evidence the certified copy of letters-

patent referred to in the last question, granted to Samuel Lewis for improved subaqueous drilling-machine, dated January 5, 1869, numbered 85,597, marked "Exhibit Lewis No. 1, G. I. W., S. Ex'r.")

Q. 2. Is the machine described in that patent the machine of which you testified in your answer to cross-question 32, on your previous examination in this case—you exhibited a model to General Newton in the summer of 1869?

A. It is a part of that machine, without showing the machinery to operate a gang of drills, and the dam left off.

291 Q. 3. Does not that patent dispense with the use of a dam in the machine there described?

A. I don't consider this a complete machine. I have other patents that make a combination for the same purpose.

Q. 4. Without reference to what you consider, does not this patent state, "This invention consists in an apparatus designed to simplify the operation of drilling rock under water, as described in my present patent, whereby the telescopic still-water dam is dispensed with, as will hereinafter be more fully described?"

A. I have already stated in my evidence that there were certain situations where I thought the dam could be dispensed with.

Q. 5. Can you not answer whether or not this patent, Exhibit Lewis No. 1, contains the words given in question 4 and marked between quotation-marks?

A. It does.

Q. 6. Look at this paper now shown you, and state what it is.

A. This is a proposal for removing obstructions at Hell Gate.

Q. 7. Made by whom and to whom?

A. Made by William H. Cammeyer, Samuel Lewis, and Ariel Patterson. I believe this don't say to whom. I presume to General Newton; he was in charge of the work at Hell Gate.

Q. 8. Are Cammeyer and Lewis, whose signatures appear upon that paper, the complainants in this action?

A. We are.

(Paper put in evidence maked "Exhibit Lewis No. 2, G. I. W., S Ex'r.")

292 Look at this paper now shown you, and state whether or not this was the advertisement in pursuance of which the proposal. Exhibit Lewis No. 2 was made.

(Objected to as not involved in the issue in this case.)

A. Mine was taken more from private conversation with General Newton in his office. This gives the date of an advertisement in a newspaper, and I presume it is the same that called for bids at that time. There is a part attached to this advertisement calling for a description of the machine, which I did not comply with.

(Paper marked "for indemnification, Lewis No. 3, G. I. W., S. Ex'r.")

SAMUEL LEWIS.

Sworn and subscribed to before me this 26th day of March, 1873.

G. IRVINE WHITEHEAD,
Special Examiner.

JOHN NEWTON, a witness produced on the part of the defendants, being duly sworn, in answer to interrogatories propounded by Mr. Davies, deposes and says:

Q. 1. What is your name, age, residence, and occupation?

A. John Newton. I am 49 years of age. I reside at No. 41 New

York avenue, Brooklyn. I am an officer in the United States Corps of Engineers, and employed in that branch of the service by the Government.

Q. 2. Upon what duty have you been engaged since 1868, and upon what duty are you at present engaged?

A. I have been engaged under the authority of the Secretary of War to devise plans and to execute the work of removal of rocks in East River, including Hell Gate; also in river and harbor works in
293 New Jersey, along the course of the Hudson as far as Troy; also in Lake Champlain, besides engaged in the construction of forts in New York Harbor and upon Lake Champlain.

Q. 3. Under what circumstances and by whose authority, and for the benefit of whom, did you design and superintend the construction of the steam-drilling scow represented in Exhibit D, and have since superintended and directed its operation.

A. The steam-drilling scow was devised and constructed for the benefit of the United States, under the authority of the Secretary of War, and the operations of the scow were superintended by me for the benefit of the United States Government, and under the authority of the Secretary of War.

Q. 4. By whom was the said scow paid for, and who has supplied the funds for its operation?

A. The drilling-scow, with all its machinery and appurtenances, was paid for by the United States Government, and its operations, repairs, &c., have been paid for by the same. These sums have been granted yearly by Congress.

Q. 5. Are you one of the defendants in this action?

A. I am.

Q. 6. Have you or any of the defendants any interest or ownership in the said steam-drilling scow? And have you and any or either of them received or expect to receive any pay, emolument or reward from the use or the operation of said scow?

(Objected to as incompetent so far as it goes to call for a statement by the witness of the expectations of other persons or the receipts of other persons.)

A. Neither myself nor any nor either of the other defendants have any ownership in the steam-drilling scow. Neither myself nor any nor either of the other defendants have received or expect to receive
294 any pay or emoluments from the use of the drilling-scow, except what the other defendants may receive or have received upon the official pay-rolls for services upon the practical operation of the scow.

Q. 7. State what is now and has been the relation that the other defendants have had to the operations of the scow during such time as they have been connected with it; and state for what time such relations were continued.

A. The defendant Eccleston has been in immediate charge of the operations of the scow since, I think, March, 1872. The defendant Quinn has been captain of the scow and chief diver since the fall of 1870. Quinn has since left the scow—I think in the fall of 1872. The defendant Isetts has been employed by me to superintend the repairs, preservation, and general working order of all the machinery under my charge in the harbor of New York, including works at other parts of the harbor than Hell Gate. And in this connection he has had incidentally a good deal to do with the care and preservation in working order of the machinery of the scow. I forget the date at which Mr. Isetts was first instructed to look after the scow.

Q. 8. Do you know how, and by whom, these other defendants were paid for such services as they rendered? And if so, state by whom they were paid, for whose account such payments were made, and whether they were paid by salary or according to the work done.

A. The other defendants were paid by me as agent for the United States Government. They were paid out of the funds appropriated by the Government for the work on the East River, including Hell Gate; and they were paid salaries approved by the Government.

Q. 9. Look at the paper now shown you, marked "for identification Lewis No. 3," and state what it is, and by whom it was published, and for what purpose.

(Objected to as not involved in the issue in this case.)

295 A. This is an advertisement calling for proposals to remove two rocks in Hell Gate, known as Frying Pan and Pot Rock. It was published by me, under the authority of the Government.

(Defendants counsel puts in evidence the paper referred to in the last question, and it is marked "Exhibit Lewis No. 3.")

(Same objection.)

Q. 10. Look at the paper now shown you, and state what it is.

(Objected to as not pleaded.)

A. This is a caveat filed by me July 19, 1869, relating to the invention of a dome or dam for submarine operations.

(Certified copy of caveat put in evidence, marked "Exhibit Newton No. 1, G. I. W., S. Ex'r.")

(Same objection.)

Q. 11. In the spring of 1872, before this machine was put in operation for that season, did you take any action with reference to the relative movement of the upper and lower sections of this done; and, if so, what; and what result, if any, was accomplished?

(Objected to as incompetent, for reasons stated in relation to testimony of the last preceding witness.)

A. I think it was the winter of 1872 that I directed that the upper section of the machine, represented by Exhibit D, should be permanently fastened or bolted to the lower section. It was afterwards reported to me that this was not done on account of the upper section sticking fast in the lower in such wise that they could not bring the two sections into the position desired, and because the two sections adhered so closely together that there was really no necessity for any additional fastening. My directions to this effect were prior to any knowledge of anticipated trouble from this suit for infringement of patent.

296 I put this in because I could not recollect the precise date at which I gave directions.

(Counsel for complainants objects to so much of the answer as states what was reported to the witness as hearsay.)

Q. 12. During the period covered by the operations of the machine represented in Exhibit D, has any use been made of the provision shown in said exhibit for the relative movement of the upper and lower sections of the dome?

A. During the period covered by the operations of the machine there has no use been made of the machinery for altering the relative positions of the upper and lower sections of the dome.

Q. 13. Has any benefit or advantage been had in the workings of the machine represented by Exhibit D as a result of the appliances shown in said exhibit as permitting a relative movement of the two sections of the dome?

(Objected to as incompetent for the reason that complainants having used the invention are estopped from denying its utility.)

A. None whatever.

And being cross-examined by Mr. How, says:

X Q. 14. At what time were you appointed to the duty of removing the rocks in the East River, including Hell Gate?

A. July 21, 1866, I was charged with an examination at Hell Gate, and to make plans and estimates for its improvement. No money was appropriated for practical work there until July 31, 1868, when I was officially notified that a sum of money had been appropriated by Congress and devoted to the improvement of Hell Gate. I advertised for contracts for the performance of that work.

297 X Q. 15. Under whose direction was the model Exhibit D made?

A. I obtained permission from the War Department to have the model made, and the direction of supervising the making of it and seeing that it was correct was given to Mr. Isetts and Mr. Kelley, two of the employés of the Government.

X Q. It was made under your general supervision also, was it not?

A. All the supervision that I had over it was looking over it occasionally. I took no measures of the parts, but directed Mr. Isetts and Mr. Kelley to see that the model was accurately constructed.

X Q. 17. And you, as one of the defendants, presented Exhibit D as a correct model of the machine referred to in the complaint and answers as having been used by you, did you not, and had it put in evidence as such a correct model, did you not?

A. The model is correct, after a careful examination of all its parts, except measurement by me, and I did believe and do believe that it is a correct model, and in that view I presented it as one of the defendants. I had it put in evidence as such a correct model.

X Q. 18. Do you mean by your answer to question 3 that you devised and constructed the machine represented by Exhibit D?

A. I mean that I devised it and caused it to be constructed under the authority of the Secretary of War.

X Q. 19. And you yourself planned the construction of the machine, did you?

A. I planned it; yes, sir.

X Q. 20. And it was in consequence of your recommendation that the authority of the Secretary of War was given to you to construct it, was it not?

298 A. I submitted a general description of the machine and received the sanction of the Secretary of War to construct it. I presume, of course, that it was in consequence of my recommendation that authority was given to me to construct it. I may add to that that I received a communication to adopt such means for the removal of these rocks as I thought best, and I constructed the machine of which I had already notified the War Department, and received approval.

X Q. 21. From whom did you receive the communication, mentioned in your last answer, to adopt such means for the removal of these rocks as you thought best?

A. I received this communication from General Humphreys, Chief of the Bureau of Engineers, who is my medium of correspondence with the Secretary of War, and his letter was written in relation to the plans which I had exhibited for the removal of these reefs, specifying my employment of the machine shown in Exhibit D, and the employment of this machine was approved by General Humphreys.

X Q. 22. And this communication from General Humphreys to adopt

such means for the removal of the rock as you thought best was the authority of which you have spoken for constructing the machine represented by Exhibit D, was it?

A. The letter of General Humphreys spoken of was in reply to a project of operation in Hell Gate which was called for from me. And this project of operations included not only the employment of the machine represented in Exhibit D, upon certain reefs lying in the channel, but the project also gave a design for the removal of the reef at Hallett's Point by means of driving tunnels and galleries under the reef. He had previously known of the machine represented by Exhibit D by my correspondence and description, and in his approval of both projects he added that I might take such measures, or words to that effect—I don't recollect the exact words—as were necessary. What was exactly
299 intended by that reply, whether general or particular, applying to Hallett's Point or the scow, I do not know; but in a subsequent communication, where, according to the routine of service, I asked special permission for the construction of a part of the machine represented in Exhibit D, he referred me to his prior letter in which he had approved the project, Exhibit D, and referred to the words there used as ample authority for me without any further specific authority to go on and construct the machine represented in Exhibit D. I may say that in the branch of the service to which I belong that we never venture to construct expensive machinery for the use of the Government without its express sanction, and that such a course is against the routine and regulations of the service.

(Answer objected to as irresponsive.)

X Q. 23. Question repeated.

A. It was not the only authority. He also approved the project which I gave and the means of carrying that project into effect. The phrase described there was merely a phrase in the latter part of the letter, after approving the project; and the meaning of the phrase I did not understand, because I afterwards applied for permission to construct a certain part of the machine described in Exhibit D.

X Q. 24. And those two letters or communications from General Humphreys were all the sanction of the Secretary of War or authority you had for constructing the machine represented by Exhibit D, were they?

A. I don't think they were. There were a great many more communications and letters, I think, but I do not recollect the words or the matter of the communications at this present time. I will say that with every appropriation passed by Congress for the work, we are required, if the office is assigned to an officer of engineers, to report a project for the application of the funds granted, and that this project must
300 be approved by the Government before it is carried into effect. The river and harbor works through the country, including the works at Hell Gate, are directed by Congress to be done under the direction of the Secretary of War, and the Secretary of War causes the officers to be detailed for this work. In the Corps of Engineers our medium of communication with the Secretary of War is General Humphreys, the Chief of Engineers, according to the law and usages of the service.

X Q. 25. Then, if I now understand you, all these letters or communications came from General Humphreys, and none of them directly from the Secretary of War. Is that correct?

A. All the letters or communications I have ever received on the subject of river and harbor works, including the operations at Hell Gate,

have been from General Humphreys, who represents the authority of the Secretary of War in such cases; and the same is the case with all the officers of the Corps of Engineers in the river and harbor works.

X. Q. 26. Please look at the matter now shown you on pages 391, 392, and 393 of the Report of Chief of Engineers for 1869, which matter purports to be a copy of a letter from you to General A. A. Humphreys, Brig. Gen. and Chief of Engineers, dated June 9, 1869, and state whether that is a copy of the communication to which you have referred as describing the construction of a machine on which was based the authority you have mentioned for constructing the machine represented by Exhibit D?

A. I have read that letter. In the first place, I cannot vouch for its literal correctness as a copy—I know nothing about that. In the next place, I cannot assert and I do not know whether that is the letter upon which the approval of the Secretary of War of my project for the machine represented in Exhibit D was given. That letter is a general description of the work intended to be done at Hallett's Point and upon the channel reefs.

301 X Q. 27. Is that letter referred to in the last question, the description of the machine referred to in your answer to cross-question 20?

A. I can't say that it is. That letter, as I remarked before, gives a general description of the operations intended upon Hallet's Point and the channel reefs. That is all I know about it.

X Q. 28. State whether the letter, of which the matter referred to in the last question purports to be a copy, was the description or contained the description referred to in your answer to question 20, as having been submitted by you?

A. I have already stated that I cannot be positive that that is the letter at all—I cannot be positive. I cannot say that this is the letter referred to in cross-question 20. This does contain a general description of the machine.

Adjourned to Thursday, March 27, 1873, at 11 o'clock a. m.

NEW YORK, *March* 27, 1873—11 o'clock a. m.

Met pursuant to adjournment.

Present: Counsel as before, and the witness, John Newton, whose cross-examination is continued, as follows:

The witness desires to correct the word "my," in the answer to the twenty-first cross-question in his examination, on the ninth line of said answer, to make it read "the"—so that the line shall read "the employment of the machine."

X Q. 29. Does the letter contained on pages 391, 392, and 393 of the Report of Chief of Engineers for 1869, which purports to be a letter from you to said Chief of Engineers, already referred to, describe

302 the machine which you received authority to build, as you have stated?

A. The letter dated June 9, 1869, referred to, contains a general description of the machine, giving its most essential parts, viz. the dome and the scow. It was on that letter that I got the permission of the Chief of Engineers to build the machine. I afterwards applied for special permission to build the scow, which was granted.

X Q. 30. And that special permission is the one referred to in your answer to a question in which you stated that you asked for a special permission, and General Humphreys referred you to his general permission as a sufficient authority, is it not?

A. I understand that special permission refers to authority to construct the scow. The permission to construct the scow was granted without any further words. And I wish here to state, by way of a clear understanding of the matter, and after refreshing my memory by consulting my records since my examination yesterday, that General Humphrey's letter notifying me of the allotment that had been made for Hell Gate of $180,000 likewise informed me that I was at liberty to use the appropriation for Hell Gate by contract or by other means, at my option, or words to that effect. This letter of General Humphreys was dated nearly one month before the date of the letter of June 9, 1869, conveying my project. In answer to the last letter, of June, 1869, General Humphreys gave me the usual official approval of the project. Afterwards I applied for permission to construct the scow, when I was ready for its construction, and received the usual official permission.

In my examination of yesterday, I was under the impression that the letter of General Humphreys, spoken of above, conveying discretionary authority, formed a part of his approval of my project, but it did not. It was written prior to the approval of the project and to the project itself.

303 X Q. 31. And the usual official permission to construct the scow was a permission to construct the apparatus described in the letter of June 9, 1869, already referred to, was it?

A. The permission to construct the scow was a special permission, over and above the antecedent permission which had been given.

X Q. 32. Well this special permission, then, to construct the scow, was a permission to construct the apparatus described in said letter of June 9, was it?

A. It was to construct a portion of it—the scow and its attachments.

X Q. 33. You have spoken of a Mr. Kelley as having assisted Mr. Isetts in the superintendence of the construction of Exhibit D. Who was this Mr. Kelley, and what special knowledge or facilities had he to fit him for the superintendence?

A. Mr. Kelley is a mechanical draughtsman, formerly employed at the Novelty Iron Works. He is well skilled in designing and executing drawings of machinery. He has been in my employment for a number of years, and I have found him well qualified. I may say he had an excellent knowledge of the scow, the dome, and the apparatus attached thereto; an intimate knowledge.

X Q. 34. Did he make the drawings from which the apparatus represented by Exhibit D was originally constructed?

A. When the apparatus was constructed at the Novelty Works, Mr. Kelley was then in the employment of that corporation. What hand he had in making the drawings at that time I do not know. He made the drawings of the scow, the dome, and all the machinery after the same came into my possession.

X Q. 35. Was not Mr. Kelley transferred from your service or
304 employment to that of the Novelty Works, for the purpose of making the drawing of the apparatus represented by Exhibit D?

A. Not to my recollection. I have always been under the impression that I never employed him until after the machine had been constructed.

X Q. 36. What drawings, if any, or sketches, did you have made from Mr. Lewis' model while it was in your possession, and who made them?

(Objected to as not relevant to anything testified to by the witness on his direct examination.)

(Question withdrawn.)

(The objection is withdrawn, and the witness answers the question.)

A. I would like the counsel to state what model he refers to. Mr. Lewis has testified that he showed me two models.

X Q. 37. Any model belonging to Mr. Lewis, or to himself and Mr. Cammeyer, or brought to your office by them.

A. I have never given directions to Mr. Kelley or to anybody else to make any such copies as referred to.

X Q. 38. Did any one while in your employ make any such copies, either from such models or from drawings of Mr. Lewis' invention or inventions?

A. Not to my knowledge, and not for my use.

X Q. 39. Where does this Mr. Kelley now reside, and what is his full name?

A. I don't know his full name, neither do I know where he now resides. Perhaps I ought to say in connection with that, that he is now in my employment, or rather in the employment of the United States.

305 X Q. 40. Can you astertain his full name and residence, and will you do so, and make the same a part of your answer?

A. I can, and will do it.

X Q. 41. How long has defendant Isetts been employed by you to superintend the repairs, preservation, and general working order of all the machinery under your charge in the harbor of New York, including works at other parts of the harbor than Hell Gate?

A. I don't know that I could give a very definite answer to that. Mr. Isetts was first employed by me as the engineer of the United States steamer that I have under my control, and from that he has gradually taken charge of the machinery at various places in the harbor of New York, or has been employed in the care, preservation, &c., of such machinery. The date at which I first told him to take charge of all the machinery in New York harbor I can't exactly recollect. I should say at least a year, but I can say nothing more than that.

X Q. 42. Has he not been employed in or had charge of the repairs and preservation in working order of the apparatus represented by Exhibit D ever since its construction?

A. Yes. He has had a good deal to do with the machinery of the scow, under special directions from me, at various times since the completion of the scow, but when I gave him general charge of all the machinery in the harbor, so that he could operate without special directions, I do not recollect positively, and refer to my last answer on that point.

X Q. 43. When you filed the caveat, Exhibit Newton No. 1, you believed the statements contained therein to be correct, did you not?

A. I did.

X Q. 44. And you now believe them to be correct, do you?

A. I do.

306 X Q. 45. Did you see the machine represented by Exhibit D often in the spring of 1872, and up to the time it was put in operation for that season, and about how often?

A. I cannot remember how often I saw it, and whether I saw it often when it was laid up for repairs at Greenpoint in the spring and summer of 1872.

X Q. 46. Are you not aware that at one time when it was so laid up at Greenpoint the upper section of the enclosure for the drills was slid down, or was down substantially its whole length into the lower section?

A. I never saw it, to my recollection, in such a position. My impression, derived from the reports of others, is that it was not.

X Q. 47. What positions did you see it in while laid up for repairs at Greenpoint?

A. There is nothing that I can recall to show that it was in any unusual position.

X Q. 48. While laid up at Greenpoint, as you have stated, did you not see said upper section when it was entirely removed from the lower section?

A. I may have done so, and possibly did, as in that winter extensive repairs were made upon the upper section, which had been severely damaged by a collision in the spring of 1871; but I have no positive recollection of seeing it any such position, that I can recall now.

X Q. 49. What were those repairs?

A. Those repairs consisted in taking out certain sheets which had been forced in by the collision, and having them rerolled and replaced, and in having the drilling-tubes fastened to the sides of the upper section.

X Q. 50. Certain sheets, in what part?

307 A. In the upper section of the apparatus represented in Exhibit D. The exact position of such damage, as to how many feet it was below the top, I don't know; I took no note of it that I can remember now.

X Q. 51. Upper section of what, in Exhibit D?

A. The upper section of the submarine apparatus.

X Q. 52. What do you mean by the submarine apparatus?

A. I mean what has been called in this trial the dome or dam.

X Q. 53. What harm did the denting of the sheets in this upper section by collision, as you have stated, do?

A. It is impossible to adjust those drill-tubes properly, and fasten them properly, with a considerable protuberance of the plates of the upper section inside; and it was an unworkmanlike-looking affair. These were the only causes of the repairs of the upper section.

X Q. 54. Did you not report to the Government in regard to that collision, or those collisions, that the telescope of the dome was crushed in so as to be incapable of being worked?

A. I could not swear to that until I should verify the statement contained in the question.

X Q. 55. Do you think you did?

A. I probably did; and if the term telescope was used by me it was used in a general and loose sense, and the term applied was inaccurate.

X Q. 56. Have you not on various occasions applied the word "telescope" to this upper section in your official reports, or otherwise?

A. As to my official reports, I do not remember; otherwise, in conversation, I may have done so, but always inaccurately, if I did it.

308 X Q. 57. During what period of time in 1872 was the machine, represented by Exhibit D, laid up for repairs at Greenpoint, as you have stated?

A. It was laid up prior to Christmas, 1871, and continued at Greenpoint through the month of March, 1872. How much longer than that I have it not in my power to answer at this time.

X Q. 58. State about how much longer, as nearly as you can.

A. I am not certain whether it stayed there through the months of May and April or not. In fact, I am quite uncertain at this time when the scow was put at work in 1872.

X Q. 59. Do you mean to be understood as saying that you had no knowledge during the time this apparatus was laid up at Greenpoint, in

1872, that a claim was made that it was an infringement of the patent on which this suit is brought?

A. I have never said so in my examination, nor anything like it.

X Q. 60. Were you not aware that such was the case for a considerable time prior to the machine being removed from Greenpoint?

A. On or about March 30, 1872, I received from the Secretary of War, through the Chief of Engineers, certain papers which had been sent by Mr. Thomas P. How, counsel for the plaintiffs in this case, to the Secretary of War, claiming, to the best of my memory, that the machine represented in Exhibit D, which had been used by the Government in the harbor of New York for the removal of rock, was an infringement of the patent of Mr. Cammeyer or Mr. Lewis, or both, the plaintiffs in this case. These papers were sent to me for my report, and the report was made and returned with the papers to the War Department.

309 X Q. 61. What alterations, if any, were made in the machine represented by Exhibit D while it was laid up at Greenpoint, as you have stated?

A. I have already spoken of the repair made to the upper section, and, in addition to that, nothing to my knowledge of any moment except increasing the number of drill-tubes. The number of drill-tubes was increased from nine to nineteen.

X Q. 62. Has this number been since changed; and, if so, to what number, and when?

A. The number has not been changed, unless by a collision which took place in Hell Gate, by which a large number of drill-tubes was destroyed. The number of drill-tubes for future work has not been yet settled.

X Q. 63. If, as you say, during the period covered by the operations of the machine, there has been no use made of the machinery for altering the relative positions of the upper and lower sections of the dome, as stated in your answer to question twelve, will you explain how, on any natural hypothesis, you came to regard the derangement, or, in other words, the crushing of the telescope of the dome so as to render it incapable of being worked, a matter of such importance as to make it necessary for you to report it to the Government?

A. In my annual report, or at various times during the year, I report matters of interest, and this that was reported was a case of collision. I had often insisted upon the utility and benefit of having the submarine part of the machine protected against the effects of collisions.

(The witness here desires to see the report upon which the question is based.)

(Counsel for complainants desires witness to first complete an answer to the question.)

(Counsel for defendants instructs the witness that if he cannot, in his judgment, answer the question definitely without being referred

310 to the alleged report, and if he has no recollection of such report, he is at liberty to decline answering the question unless the same be submitted to him.)

(Counsel for complainants objects to the instruction given to the witness by his counsel as highly improper.)

The witness continues his answer:

As this was the first collision in which damage had been done to the dome or any part of the submarine apparatus, and as the matter was fresh in my mind from the fact of having directed information to be collected with regard to the collision for the purpose of bringing suit against the colliding vessel, it is presumed that this was the reason, or

principal reason, for making the alleged report. I know of no other. If the collision referred to is the one I have in mind, I presume that I desired to communicate the fact that the submarine apparatus had received a severe blow, that is all.

X Q. 64. Is that all the reason you can give why you should have made particular point in your report of the fact that the telescope had been so crushed that it could not be worked, or, to put it in other words, so that it would not strike freely?

A. I know of no other reason. With regard to the last part of the question it does not allege to be the words used in any communication of mine to the Government.

X Q. 65. Have you been present during the taking of the testimony in this cause?

A. I have been present during the taking of the testimony in this cause, with an intermission or so. I have forgotten the number, but I believe it was one.

X Q. 66. Have you not heard several of the witnesses testify to the raising and lowering of the telescope in the dome?

311 A. I have heard no testimony about raising or lowering (I will remark here that the term "telescope" I have never heard at all by any witness in respect to having been lowered or raised) the upper section of the submarine part of Exhibit D when the machine was in operation.

X Q. 67. Question repeated.

A. I have not heard any testimony, as far as my memory serves, of a telescope, or the telescope being moved.

X Q. 68. Did you hear the testimony of the witness Conklin, in this case?

A. I did.

X Q. 69. Did you hear the testimony of the witness Rodman, in this case?

A. I did.

X Q. 70. Did you hear the testimony of the defendant Quinn, in this case?

A. With regard to the testimony of Quinn, I was, for the most of the time, engaged in looking over papers of my own, and heard but a portion of his testimony.

X Q. 71. Do you not know that each of these witnesses testified to the raising or lowering of the upper section, or, as it is termed in your report of 1871, the "telescope" in the dome or lower section of what you call the submarine apparatus?

A. I do not know that either of these witnesses used the word telescope, as I have stated before. I do know that the witnesses Conklin and Rodman testified to a movement of the upper section of the submarine apparatus, but neither one of the witnesses, Conklin or Rodman, testified to the raising and lowering, so far as my memory serves; that is, that each one of them testified to both raising and lowering. My memory of the testimony is that Conklin testified to one motion and Rodman to another. I may be mistaken; there is the testimony to refer to. As to the defendant Quinn, my attention was too much disturbed by other matters to be certain what he did say.

312 X Q. 72. How, in view of this testimony of Conklin and Rodman, are you able to say, as you do in your answer to question 12, that "during the period covered by the operations of the machine there has no use been made of the machinery for altering the relative positions of the upper and lower sections of the dome?"

A. In the first place, no movement of the upper section of the submarine apparatus has been made during the period of the operations of the drilling-machine. In the next place, the upper section has never been moved, except when the drilling-machine was laid up for repairs, &c.; and in the third place, because it was never designed, nor was it possible, to move this upper section when the machine was in operation.

X Q. 73. Do you mean to be understood that the testimony of the witnesses Conklin and Rodman on this point is untrue?

A. No. The upper portion of the machine in neither case was moved while the machine was in operation.

X Q. 74. You admit, then, that it was moved.

A. I do not, for I never saw it moved. I answered on the testimony of others, as required to do.

X Q. 75. What was the object of making this upper section adjustable in the lower section?

A. It was a mere experiment in the beginning, which was abandoned as soon as actual work commenced, for it was considered to be unprofitable to use it in such sense.

I am bound to say in connection with this, that to the best of my knowledge on the subject, which I have gathered from persons connected with this drilling-scow, that that arrangement which the counsel calls the telescope would not work, owing to various defects in its first construction and to other causes happening thereafter.

X Q. 76. Question repeated.

313 A. I have said already that it was an experiment, and that experiment was abandoned before actual operations were commenced.

X Q. 77. Question again repeated.

A. In the submarine apparatus it was considered necessary to have a curbing around the top of the aperture. It was thought that such a curbing, when the machine was under water, would tend to prevent the current impinging on the surface of the dome, and rising with the dome, from plunging into the interior of the dome. For this purpose a curbing of four or five feet in height was considered necessary or proper; and in order to effect that, the movable portion, or the upper portion of the machine there, was made to project outside—say some five feet, or about five feet. The intention in the beginning was always to keep the upper part—the upper rim of that upper section—below the bottom of the scow, so that in case the scow should get adrift it would not encounter any portion of the dome, which might produce damage or great destruction to the lower part of the apparatus. This, as I remarked before, was put in as an experiment; but the upper portion was never intended, nor was it possible from the construction of it, to lower it or raise it when the machine was at work. It was supposed in the beginning, as a mode of work, that before we went upon a reef, having the soundings ready, we could tell at what height to set the upper section, so that the scow, if it broke loose, would not strike any portion of the dome. But if this were not possible, owing to the shoalness of the water at any portion of the reef, at least it could be set so low as to avoid the danger for the rest of the reef. But other considerations more important induced me to regard and use this upper portion as a fixture, and the first design or intention was never carried out.

X Q. 78. Do you mean to say that the telescope was never adjusted in the dome, so as to project to a greater or less distance above the dome, after actual operations were commenced?

314 A. The actual height of the rim of the upper section above

the dome—I do not know from actual knowledge, I have heard testimony here which states it to have been about five feet six inches for both the seasons 1871 and 1872—that is my memory of the testimony. I have also heard testimony that on one occasion, before operation was commenced, the upper section was drawn out. And I have also heard testimony that the dome was taken out of the water and slung in the chains, and that the upper section was forced down some distance before work could be carried on.

Now these two events, from reports made to me, I believe to have been in consequence of each other. That in the first case a mistake was made, and the upper section was raised too much; and in the second case a great loss of time—work had to be interrupted, the dome slung out of water, and men had to go inside, and with the use of mauls, &c., had to bring it down somewhat—reduce its height.

X Q. 79. Then you do believe the upper section or telescope has been adjusted in the lower section or dome since actual operations commenced, do you? Please make your answer as brief and direct as possible.

A. I will state to the counsel that I make my answers as brief and direct as a person with a correct knowledge of the circumstances could be expected to do.

If it is assumed that actual operations commenced with a mistake, according to my testimony, then the upper section was moved after the commencement of actual operations. But if the second movement of the upper section be considered only a rectification of the first mistake, I should say there was no movement after the commencement of operations. These two events followed each other, according to my belief and information.

X Q. 80. But this raising and lowering that the witnesses have testified of were a year or more after the machine went into operation, were they not?

315 A. I have understood and believe that these events took place in the spring of 1871, at the very commencement of work, and that period is the period of our commencing actual work for the removal of the reefs in this harbor.

X Q. 81. Was not this machine set to work in 1870, in the early part of the year?

A. This machine was taken upon Diamond Reef in the latter part of the fall of 1870, and continued upon that reef during the month of December until, I think, January 3, 1871. This was intended as a trial or experiment of the machine, in order that I might report upon its capacity for work. We were very uncertain until after this experiment about mooring and holding the scow in proper position, which was necessary for the success of the operation.

(The witness states that he misunderstood the date mentioned in the question, and answers to the question:)

It was not set to work in 1870. There were no drilling-engines on board. The scow, with the dome, was taken out for one day, and ordered by me to return.

X Q. 82. State what rocks you have worked on with the machine represented by Exhibit D, wherewith the telescope extending five feet and a half above the top of the dome it would clear the scow and allow it to pass over it without touching, at low tide.

A. There are certain portions of Diamond Reef, Coenties Reef, Pot Rock, and Frying-Pan, where, if the dome were placed with this height from top to bottom, the scow would pass over the top of it at low water. This is my answer according to my understanding of the question.

X Q. 83. Were those portions of those rocks portions on which you actually did work with the machine to increase the depth of water and remove the rock?

316 A. I think it is undoubtedly the case that it was in those positions, for it is necessary to have it at that depth in order to reach the depths proposed.

X Q. 84. What were the depths proposed?

A. For Hell Gate we propose twenty-six feet, if possible, at mean low water. For Diamond and Coenties Reefs, in East River, without actually deciding the case, twenty-five feet has been considered by me as the depth to be reached.

X Q. 85. To what greatest depth did you actually reduce the rock at mean low water on these reefs?

A. With regard to Pot Rock and Frying-Pan, there have been no surveys made since our partial operations there, and I could state nothing with regard to those two. With regard to Diamond and Coenties Reefs, no surveys have been made since last season's operations, and I cannot state precisely with regard to them. I trust nothing but official surveys in these matters, and these require a long time to perfect, and all my surveyors have been too busy during the past year for me to set them to work at this.

X Q. 86. State your best jud'ment.

A. I think (not from my judgment, for I have no means of judging, but from my memory) that the pilots, within the past year, have notified the commissioner of pilots that vessels drawing about twenty-one feet have touched at or near Diamond or Coenties Reefs, or both. This refers to low water, I think.

X Q. 87. The height*h* of the dome or lower section in the machine represented by Exhibit D is twenty feet, is it not?

A. It is not.

X Q. 88. How much, then?

A. Fourteen feet four inches.

317 X Q. 89. The scow draws four or five feet of water, does it not?

A. It is generally estimated at about four feet six inches.

X Q. 90. Now, will you tell me how, according to these estimates or measurements, the scow could possibly pass over the top of the telescope when set five feet six inches above the top of the dome in twenty-one feet of water?

A. I have to say that the scow, with that draft of water, height*h* of upper section, and height*h* of dome, could not pass over the top of the submarine apparatus in twenty-one feet of water.

Cross-examination closed.

The redirect examination of the witness is adjourned to Tuesday, April 1, 1873, at 11 o'clock a. m.

NEW YORK, *April* 1, 1873—11 o'clock a. m.

Met pursuant to adjournment.

Present: Counsel for both parties, and the witness, John Newton.

The witness makes the following correction in a part of his answer to the seventy-seventh cross-interrogatory, so that instead of "For this purpose a curbing of four or five feet in height*h* was considered necessary or proper," it shall read as follows: "For this purpose a curbing not more than five feet in heighth was considered necessary or proper."

318 And for a further answer to the fortieth cross-interrogatory,

the witness gives the name and address of Mr. Kelley, therein referred to, as follows:

Mr. Kelley gave me his address and name, as follows: James R. F. Kelley, 938 Gates avenue, furthest up, in Brooklyn.

And being examined, on his redirect, says:

R. D. Q. 91. Has the defendant Isetts had any connection with the control, management, or operation of the machine represented by Exhibit D?

A. Not to my knowledge. He was not so assigned, and the duties which were given him, and which I have already testified to, would have been inconsistent with his having to do with the operations of the machine.

R. D. Q. 92. What proportion did the depth of water of twenty feet on the reefs, concerning which you have testified on your cross-examination, bear to the greater depth of water upon such reefs?

A. At mean low water the area upon those reefs having a depth over it of twenty feet or less was, to the whole area of the reefs necessary to be removed, as one to about fourteen. This refers to the reefs before they were operated upon by the drilling-machine.

R. D. Q. 93. State fully what was done with the machine represented by Exhibit D during the whole of the year 1870, giving the times when operations, if any such were had, commenced, and when they terminated, and what, if anything, was done by the machine.

A. Early in January, in 1870, the machine, in an unfinished state—that is to say, the scow and dome, and upper section of the dome—without any arrangement for drilling or blasting, was taken to Diamond Reef and the dome was lowered to the bottom. I ordered the machine back again; she was out on the reef about a day. No operations of drilling and blasting and removing rock were conducted. Later,
319 in the year 1870, in the latter part, I think, of the month of November, towards the end of the month of November—the machine meanwhile having been provided with a sufficient number of drilling-machines to conduct an experiment upon the applicability of the machine to drilling in a current—was moored upon Diamond Reef. The machine remained upon this reef until the early part of January, 1871, probably about the 6th of January, when the machine was taken back to Greenpoint and laid up for the winter. During this latter part of the operations of the machine the dome was lowered twice, and there were two setts of holes drilled. These holes were charged with nitro-glycerine and exploded. The object of this experimental trial or operation was to ascertain the firmness of the machine for the object for which it was intended, viz, drilling rock, and to observe likewise the effect of nitro-glycerine discharges.

R. D. Q. 94. Have you read the testimony of Quinn since your last examination, and do you remember the occasion of the raising and lowering of the upper section of the machine represented by Exhibit D? State when that occurred, if you know, and whether or not it was the same raising and lowering as that testified to by the witnesses Conkling and Rodman.

(Objected to as leading, and also as already answered, because the witness has already stated that no use was made of the provision for raising and lowering the upper section or telescope in the lower section or dome of the enclosure for the drills in the machine represented by Exhibit D.)

A. I read the testimony of Quinn since my last examination, and believe that Quinn in his testimony refers to the raising and lowering tes-

tified to by Rodman and Conkling. This lowering, I believe, took place between the 26th of April and the 15th day of May, 1871. On that date, May 15, a collision by canal-boats caused a surging of the scow against the upper section of the dome, causing such an alteration of the figure of the upper section that it could not be moved afterwards during the whole season's operations. The raising of the dome took
320 place prior to lowering the dome to commence operations. These dates, the 26th of April and the 15th of May, I obtain from official reports made to my office.

I should remark that the scow was moored on the reef on the 26th of April.

Recross examined by Mr. How, the witness says:

R. X Q. 95. What was the depth on Diamond Reef in the shoalest part, at low water, when you commenced operations upon it?

A. There was one point of fifteen feet and a half at mean low water. I will say that these points were necessarily of very small area. It is impossible to say the exact area, because we got but one sounding. It might have been about four square feet; scarcely more than that. Soundings were taken very frequently, and any appreciable area with this depth upon it would have been detected and marked down.

R. X Q. 96. How much of it was less than twenty feet deep at low water?

A. There was one hundred and sixty-four square feet of surface on Diamond Reef, equivalent to eighteen square yards, which was less than twenty feet.

R. X Q. 97. What was the shoalest depth of water, at low water, on Coenties Reef when you commenced operations upon that?

A. Three thousand five hundred and ninety-eight (3,598) square feet of area, equivalent to about three hundred and ninety-nine square yards, on Coenties Reef. This refers to the area of that portion of the reef which had over it a depth of twenty feet or less at mean low water. There were four soundings upon Coenties Reef of fifteen or fifteen and a half feet, separated by large intervals; the intervals might have been ten, twenty, or thirty feet—or even more than thirty feet.

321 R. X Q. 98. How much of the portion operated upon on Diamond Reef was more than twenty-four feet under water when the machine represented by Exhibit D was last placed upon such portion, if any?

A. I couldn't answer that question with any degree of certainty. The question calls for the area contained between the twenty-four feet curve at mean low water, and the twenty-five feet curve at mean low water, which I have not the means of answering, or even judging, from memory. The soundings declined from the higher part of the reef out to deep water, and the machine was promiscuously placed upon all parts of the reef that we were able to get at.

R. X Q. 99. Did you operate on any parts of Diamond Reef that were over twenty-four feet under water, at low water, when the machine was placed upon such part?

A. I am quite confident that we did. I know that we did. The object was to cover by the machine the part of the reef intended to be removed, which extended out to the twenty-five feet curve.

R. X Q. 100. Do you mean to say, in your last answer, that no portion of the dome covered rock which was less than twenty-four feet under water, at low water?

A. The answer to this question is very fully given in my last answer, which stated that the object was to cover the whole reef extending out

to the twenty-five foot curve, which answer covered depths of less than twenty-five or twenty-four feet, at mean low water. I never intended to say, and did not say, that the machine never covered points which had a less depth than twenty-four feet at mean low water.

R. X Q. 101. Did you mean to say that the machine was ever placed upon Diamond Reef in a position where the shoalest depth of water, at low water, of the portion covered by the dome was less than twenty-four feet?

322 A. The machine has been upon portions of Diamond Reef, at mean low water, where the depth was less than twenty-four feet. That answer is contained in my previous answers.

The machine has been placed upon Diamond Reef where the depth was less than twenty-four feet at mean low water. From my memory of the contour of the reef, I should say that it has been in positions where the depth of water was about twenty feet, and I hardly think it could be less than this, unless by accident the edge of the dome should have been allowed to rest upon a projecting point.

R. X Q. 102. Did you mean, in your answer to recross question ninety-nine, that the machine had ever been placed upon any portion of Diamond Reef, where the shoalest depth of water under the dome at low water was more than twenty-four feet?

A. I meant to say, that we went out to the very verge of the portion of the reef intended to be removed, viz, at a depth of twenty-five feet. In a case of this kind the dome would naturally overlap the twenty-five foot curve, and a portion of it be in deeper water, so that it is very probable that the area covered by the dome would have been, in such case, at a greater depth than twenty-four feet at mean low water.

R. X Q. 103. Do you mean to say that you know of any case in which the shoalest depth of that portion of the reef covered by the dome was more than twenty-four feet at low water?

A. I can simply say that I believe it to be the case, for the reason given in my last answer, and I am very confident of it, there being no reason why it should not be so when we were working upon the extreme portions of the reef. It being necessary to overlap and extend beyond the actual portion intended to be removed in the great majority of instances, in order to secure the removal of the portion aimed at, and I know that the dome has been on the very verge of the reef, on Diamond Reef.

323 R. X Q. 104. This raising up of the telescope in the dome, testified of by the witnesses Conkling, Rodman, and Quinn, took place after you had got through work upon Diamond Reef, and when you were preparing to go to work with the machine on Coenties Reef, did it not?

A. That is not my understanding of it. It took place at the very beginning of operations in 1871, and operations commenced on Diamond Reef, and in a short time thereafter, viz, on the 15th day of May, the collision with the upper portion of the submarine apparatus took place, which collision took away from that upper portion all capacity of moving for the rest of the season.

R. X Q. 105. Was this the first of your work on Diamond Reef?

A. This is the first work of actual operations, as we have been accustomed to style it. I have already stated that in the latter part of the fall of 1870, until about the 6th of January, 1871, the machine was placed for an experimental trial upon Diamond Reef, in which two rounds of holes, or portions of two rounds, were drilled and blasts exploded with nitro-glycerine. This was an experimental trial, and the

tified to by Rodman and Conkling. This lowering, I believe, took place between the 26th of April and the 15th day of May, 1871. On that date, May 15, a collision by canal-boats caused a surging of the scow against the upper section of the dome, causing such an alteration of the figure of the upper section that it could not be moved afterwards during the whole season's operations. The raising of the dome took
320 place prior to lowering the dome to commence operations. These dates, the 26th of April and the 15th of May, I obtain from official reports made to my office.

I should remark that the scow was moored on the reef on the 26th of April.

Recross examined by Mr. How, the witness says:

R. X Q. 95. What was the depth on Diamond Reef in the shoalest part, at low water, when you commenced operations upon it?

A. There was one point of fifteen feet and a half at mean low water. I will say that these points were necessarily of very small area. It is impossible to say tne exact area, because we got but one sounding. It might have been about four square feet; scarcely more than that. Soundings were taken very frequently, and any appreciable area with this depth upon it would have been detected and marked down.

R. X Q. 96. How much of it was less than twenty feet deep at low water?

A. There was one hundred and sixty-four square feet of surface on Diamond Reef, equivalent to eighteen square yards, which was less than twenty feet.

R. X Q. 97. What was the shoalest depth of water, at low water, on Coenties Reef when you commenced operations upon that?

A. Three thousand five hundred and ninety-eight (3,598) square feet of area, equivalent to about three hundred and ninety-nine square yards, on Coenties Reef. This refers to the area of that portion of the reef which had over it a depth of twenty feet or less at mean low water. There were four soundings upon Coenties Reef of fifteen or fifteen and a half feet, separated by large intervals; the intervals might have been ten, twenty, or thirty feet—or even more than thirty feet.

321 R. X Q. 98. How much of the portion operated upon on Diamond Reef was more than twenty-four feet under water when the machine represented by Exhibit D was last placed upon such portion, if any?

A. I couldn't answer that question with any degree of certainty. The question calls for the area contained between the twenty-four feet curve at mean low water, and the twenty-five feet curve at mean low water, which I have not the means of answering, or even judging, from memory. The soundings declined from the higher part of the reef out to deep water, and the machine was promiscuously placed upon all parts of the reef that we were able to get at.

R. X Q. 99. Did you operate on any parts of Diamond Reef that were over twenty-four feet under water, at low water, when the machine was placed upon such part?

A. I am quite confident that we did. I know that we did. The object was to cover by the machine the part of the reef intended to be removed, which extended out to the twenty-five feet curve.

R. X Q. 100. Do you mean to say, in your last answer, that no portion of the dome covered rock which was less than twenty-four feet under water, at low water?

A. The answer to this question is very fully given in my last answer, which stated that the object was to cover the whole reef extending out

to the twenty-five foot curve, which answer covered depths of less than twenty-five or twenty-four feet, at mean low water. I never intended to say, and did not say, that the machine never covered points which had a less depth than twenty-four feet at mean low water.

R. X Q. 101. Did you mean to say that the machine was ever placed upon Diamond Reef in a position where the shoalest depth of water, at low water, of the portion covered by the dome was less than twenty-four feet?

322 A. The machine has been upon portions of Diamond Reef, at mean low water, where the depth was less than twenty-four feet. That answer is contained in my previous answers.

The machine has been placed upon Diamond Reef where the depth was less than twenty-four feet at mean low water. From my memory of the contour of the reef, I should say that it has been in positions where the depth of water was about twenty feet, and I hardly think it could be less than this, unless by accident the edge of the dome should have been allowed to rest upon a projecting point.

R. X Q. 102. Did you mean, in your answer to recross question ninety-nine, that the machine had ever been placed upon any portion of Diamond Reef, where the shoalest depth of water under the dome at low water was more than twenty-four feet?

A. I meant to say, that we went out to the very verge of the portion of the reef intended to be removed, viz, at a depth of twenty-five feet. In a case of this kind the dome would naturally overlap the twenty-five foot curve, and a portion of it be in deeper water, so that it is very probable that the area covered by the dome would have been, in such case, at a greater depth than twenty-four feet at mean low water.

R. X Q. 103. Do you mean to say that you know of any case in which the shoalest depth of that portion of the reef covered by the dome was more than twenty-four feet at low water?

A. I can simply say that I believe it to be the case, for the reason given in my last answer, and I am very confident of it, there being no reason why it should not be so when we were working upon the extreme portions of the reef. It being necessary to overlap and extend beyond the actual portion intended to be removed in the great majority of instances, in order to secure the removal of the portion aimed at, and I know that the dome has been on the very verge of the reef, on Diamond Reef.

323 R. X Q. 104. This raising up of the telescope in the dome, testified of by the witnesses Conkling, Rodman, and Quinn, took place after you had got through work upon Diamond Reef, and when you were preparing to go to work with the machine on Coenties Reef, did it not?

A. That is not my understanding of it. It took place at the very beginning of operations in 1871, and operations commenced on Diamond Reef, and in a short time thereafter, viz, on the 15th day of May, the collision with the upper portion of the submarine apparatus took place, which collision took away from that upper portion all capacity of moving for the rest of the season.

R. X Q. 105. Was this the first of your work on Diamond Reef?

A. This is the first work of actual operations, as we have been accustomed to style it. I have already stated that in the latter part of the fall of 1870, until about the 6th of January, 1871, the machine was placed for an experimental trial upon Diamond Reef, in which two rounds of holes, or portions of two rounds, were drilled and blasts exploded with nitro-glycerine. This was an experimental trial, and the

superintendent reported to me on several occasions, two or three times, that it I intended to make this more than a mere experiment that there were a great many things to be supplied in order to conduct work regularly and profitably. I did not supply him, and took the machine off the reef. The object having been accomplished, viz, proving, for the first time, that it was possible to drill in a current, to moor the scow, and to perform other necessary functions which, up to that time, had not been proved.

JOHN NEWTON.

Sworn and subscribed to before me this 1st day of April, 1873.

G. IRVINE WHITEHEAD,
Special Examiner.

324 HENRY M. MEEKER, a witness on the part of the defendants, being produced and sworn, in answer to interrogatories propounded by Mr. Davies says as follows:

Q. 1. What is your name, age, residence, and occupation?

A. Henry M. Meeker; I am 35 years of age. I reside at No. 681 Greenwich street, in the city of New York. I am chief clerk to General Newton.

Q. 2. Were you employed in General Newton's office in the spring and summer of 1868, and did you have any charge, and, if so, what, of getting out the reefs in Hell Gate and in the harbor of New York?

A. I was employed in General Newton's office at that time, and had charge of office papers relating to that work.

Q. 3. While you were so employed was this machine represented in Exhibit E, or any drawings or photographs of such machine, in General Newton's office?

A. I never saw either a model or drawings or photographs of such machine.

H. M. MEEKER.

Sworn and subscribed to before me this 1st day of April, 1873.

G. IRVINE WHITEHEAD,
Special Examiner.

(Counsel for defendants puts in evidence copy of a publication by the House of Representatives of a communication from the Chief of Engineers and report of General Newton, Executive Document No. 90, 39th Congress, marked "Defendants' Exhibit Newton No. 2, G. I. W., S. Ex'r.")

It is agreed by and between the counsel for the respective parties that Exhibit Newton No. 2 may be read upon the trial of this cause in the same manner and with the same effect as if the publication thereof had been duly proved.

Adjourned by consent to new notice.

325 At a stated term of the circuit court of the United States of America for the southern district of New York, in the second circuit, held at the United States court-rooms, in the city of New York, on Thursday, the 30th day of April, in the year of our Lord one thousand eight hundred and seventy-four.

Present, the honorable Samuel Blatchford, circuit judge.

WILLIAM A. CAMMAYER ET AL.
v.
JOHN NEWTON ET AL.

The above cause coming on for hearing, Mr. Thomas P. How is heard

in behalf of the complainants. Mr. Henry E. Davies, jr., is heard in behalf of the defendants.

326 At a stated term of the circuit court of the United States of America for the southern district of New York, in the second circuit, held at the United State court-rooms, in the city of New York, on Friday, the first day of May, in the year of our Lord one thousand eight hundred and seventy-four.

Present, the honorable Samuel Blatchford, circuit judge.

W. H. CAMMEYER ET AL.
v.
JOHN NEWTON ET AL.

The above cause being still on hearing. Mr. Henry E. Davies, jr., continues in behalf of the defendants.

327 At a stated term of the circuit court of the United States of America for the southern district of New York, in the second circuit, held at the United States court-rooms, in the city of New York, on Monday, the 4th day of May, in the year of our Lord one thousand eight hundred and seventy-four.

Present, the honorable Samuel Blatchford, circuit judge.

W. H. CAMMEYER ET AL.
v.
JOHN NEWTON ET AL.

The above cause being still on hearing, Mr. Charles M. Keller is heard on behalf of the defendants.

Cur. adv. vult.

328 Circuit court of the United States for the southern district of New York.

WILLIAM H. CAMMEYER AND SAMUEL LEWIS
vs.
JOHN NEWTON AND OTHERS.
In equity. June 10th, 1874.

BLATCHFORD, J. This suit is brought on letters-patent granted July 28th, 1868, to William H. Cammeyer, as assignee of Samuel Lewis, as inventor, for an "improved portable and adjustable still-water dam." The specification states that the invention is an "improved portable and adjustable dam for the purpose of producing still water in which to operate for the blasting and removal of obstructions in rivers and other water-courses." It says: "It is a fact well known to practical men that the work of blasting rocks under water is attended by many and great difficulties. Wherever such obstructions exist in a channel, they produce a throttling or contraction of the water-course, and a consequent acceleration of the current or tidal flow, that renders any operation with a view to their removal next to impossible, except during two or three hours of the twenty-four of each day. Taking, as an example,

329 Hell Gate, between the city of New York and Long Island, it has been found impracticable, owing to the intensity of the current, to work unintermittingly with any apparatus or process yet devised. On account of the nature of the bottom, a coffer-dam was out of the ques-

tion; the drilling by hand from the surface is equally impracticable, owing to the depth of the water and the difficulty already named; while the surface blasting of Maillefert was simply a criminal waste of explosives, which spent their force mainly upon the yielding water surrounding and overlying the blast or charge. Thus, in the absence of means to remove these subaqueous obstructions, some of our most important water thoroughfares are either partially or entirely closed to the commerce of the world, and vessels of light draught and small consequence to trade are the only users of channels which, with but little addition to the work of nature, might be converted into highways for the most precious freights that float, at once increasing the inducements, by extending the facilities, of commercial intercourse. In view of this most important desideratum, the present applicant has devised the apparatus herewith submitted, the main object of which he would premise to be the enabling of workmen (when necessary) to continue their operations during the entire day and night, without any reference to the strength or state of the tide, or the varying depth of the water, and, by using a number of drills simultaneously, to increase the amount of execution almost indefinitely. These results can be accomplished, it is believed, by the mechanism accompanying these presents, and illustrated in the drawing attached." The difficulty of blasting rocks under water in a channel-way such as Hell Gate, and the importance of devising an apparatus for doing the work not only with facility but continuously, are not overstated in this language. To achieve success in such an
330 undertaking was an object worthy of the efforts of any inventor or engineer. But it is evident from the language of the specification that Lewis had not, before taking out his patent, put to any practical test or use the apparatus he describes. He says that he believes his mechanism will accomplish the results desired. The description given in the specification of the apparatus of Lewis is substantially this: Two boats are prepared, (double-enders, as shown,) on one or each of which is an engine of requisite power, with propeller and machinery complete, for moving the boat, raising the anchors, varying the depth of the dam, and operating the drills. These boats or hulls are connected by a substantial deck. This deck has an opening in its centre equal to the horizonal area of the dam, for the purposes of access and light to the diver, &c. From this deck is suspended the telescopic or sectional portion of the apparatus, with its chains and attachments all previously adjusted, and ready to be drawn through their respective openings in the deck. The manner of constructing the telescopic portion is to prepare a series of plates of galvanized iron, or any other proper material, of suitable thickness, and bend and fasten them into the form shown in the drawings, (which is that of an acute-angled parallelogram of greater length than width, there being a series of such parallelograms sliding vertically one within another,) so as to offer the least resistance to the tide or current, thereby easing the work of the anchors and contributing to the control of the apparatus generally. Each division of the dam is bent inwards at its upper edge, and at its lower edge has a strip fastened, so as to prevent the sections from separating. Each section is likewise provided with four eyes or eye-bolts, one at each side and one at each end, which serve as guides to the several sections while opening, the eye-bolts on the bottom section being attached permanently to the chains through which the
331 dam is operated. The bottom section is provided with four framed wheels or eye-bolts for the side-anchor chains to pass through. These side-anchor chains are to be operated by windlasses, and extend

from the boats above through the eye-bolts on the bottom section, and then outward to the side-anchors. There are also chains directly from the boats to the side-anchors, and chains from the ends of the boats directly to end anchors. The dam is to be operated by windlasses. The drills work in tubes, the lower ends of the tubes being fastened into braces attached to the bottom section of the dam. The upper ends of the drill-tubes play freely in a guide-plate attached permanently to the boats, so as to enable them to slide up and down and adapt themselves to the depth of the dam. It is stated, however, that a full-length tube is not deemed essential, as a section of sufficient height above the braces on the bottom section of the dam to prevent the drill from being entirely withdrawn therefrom during a stroke is for some reasons to be preferred, and that if the stroke of the drill be twelve inches, a length of tube of fifteen inches, set with a rocking-joint in the lower brace, would be all that is essential to guide the drill. The bottom section of the dam has attached to it on the outside sockets, in which move and play freely in a vertical direction, by the force of gravity, what are called "self-anchors," 3, being bars of iron, shown to be of a length nearly equal to the height of the two lower sections of the dam, which, by virtue of their length and free play, adapt themselves to the irregularities of the bottom, and take a rigid and steady hold. They are to be connected with the deck, so as to be taken out of the way when desirable. The telescopic apparatus is suspended from the deck by four links and bolts, and the several chains are drawn through their respective openings and attached to their proper windlasses. The boats, dam, and all appurtenances
332 being complete, with the sliding sections closed, the machine is taken to the spot on which it is intended to begin work, the anchors are put out, and the dam is lowered. The various self-anchors find bearings at various lengths below the bottom edge of the bottom section, according to the inequalities of the rock. It is stated that they will render any movement of the dam "very improbable, especially when assisted by the co-operative hold of the outside anchors;" that is, the side anchors, chains from which run through the eye-bolts on the bottom section of the dam to the deck of the boat. The claims, four in number, are in these words:

"1. The construction and arrangement of a portable and adjustable dam in sliding or telescopic sections, in the manner and for the purposes herein described; 2. The combination of the self-anchors, 3, with the dam, in the manner and for the purposes herein described; 3. The combination of the boats, supports, or floats with the dam, as above described, and the arrangement of anchors to hold such boats in position, in the manner and for the purposes described; 4. The combination and arrangement of windlasses, chains, and boats with the dam, as above described, so that, by the construction thereof, a series of drills may be operated within and enclosed by the dam, in the manner and for the purposes herein described."

It is very clear that the construction and arrangement of the dam in the manner described in the specification requires that it shall be suspended from the main deck at all times when it is in use as a dam. The specification states that figure 3 of the drawings shows "the manner of suspending the dam from the main deck." Again, the specification says, that from the deck "is suspended the telescopic or sectional portion of the apparatus," and that "the telescopic apparatus, thus prepared, is then suspended from the deck." When, therefore, the first claim of the patent claims "the construction and arrangement of a portable and
333 adjustable dam in sliding or telescopic sections, in the manner and

for the purposes herein described," it is a necessary part of the manner of construction and arrangement of the dam in such sections that it shall be suspended from the deck when in use, and such suspension is a necessary element of the claim. The sections are not only free to slide on one another, but, when the dam is in use, the sections are to adjust themselves to varying depths of water, such as are caused by the rise and fall of the tide, whereby the distance of the point of suspension of the dam from the bottom is varied. This requires that the top section shall be, at all times, connected with the boat by links and bolts, as stated in the specification, or by means equivalent, and that the bottom section shall be connected, or "attached permanently," as stated, by chains, or by means equivalent, with a hoisting apparatus on the boat. If the top section is not connected with the boat, the letting down of the bottom section will cause all the other sections to go down with it, and they will not be opened out telescopically. If the top section is connected with the boat, and the bottom section is not connected with a hoisting apparatus on the boat, the dam cannot be lifted, and the bottom section will always rest on the bottom, or, in water deep enough, the sections will all of them remain extended to their full length. No dam constructed and arranged in sliding or telescopic sections can be constructed and arranged in the manner described in the patent, so as to be within the first claim thereof, unless the sections are free at all times, when the dam is in operation, to slide on each other, and unless the top section is attached to and suspended from the boat, and the bottom section is connected with a hoisting apparatus on the boat.

The second claim of the patent is a claim for "the combination of the self-anchors, 3, with the dam, in the manner and for the purposes herein described." As the dam, in its telescopic sections, was to be self-adjusting to tidal and other variations of depth, so the
334 self-anchors must be free to slide in their sockets with the rise and fall of the bottom section, so as to rest always on the bottom, whatever the position of the bottom section relatively to the bottom. Unless the bottom section should be free to slide on the self-anchors, then, when, by reason of the depth of the water, the sections should be extended to their full length, a raising of the bottom section by an increase in the depth of the water would raise the lower ends of the self-anchors from the bottom, and not only would they not be self-anchors, but the losing of their hold on the bottom would very probably subject the dam to such movement as to clog or stop the working of the drills. The suspension of the dam from the boat introduced a difficulty which the self-acting or self-adjusting feature of the self-anchors, by their being thus free at all times from attachment to their sockets, was designed to overcome. This feature of self-adjustment in the self-anchors was necessary to maintain the connection of the dam with the bottom at all times, and the necessity for such feature grew out of the fact that the dam was suspended from the boat, and the connection of the dam with the bottom was liable to be severed by the receding of the boat from the bottom as the tide should rise beyond a depth equal to the extreme extent of the sections. Therefore, the feature of self-adjustment in the self-anchors is inseparable from the feature of the suspension of the telescopic dam from the boat. The term "self-anchors," in the specification, and in the second claim, means anchors capable of self-adjustment by having at all times free play, because not attached to their sockets, and so not moving with the movement of the bottom section to which the sockets are attached; and the term "the dam" in the second claim means a dam suspended from the boat, with the re-

sulting consequences in its movement, in operation before stated. A combination, to be within the second claim, must be a combina-
335 tion of such self-anchors with such a dam, and the combinations must be made in the manner described, that is, so as to allow of such self-adjustment in the self-anchors.

The organization of the plaintiffs' structure proceeds on the principle that it is to be firmly attached to and suspended from a floating boat, and to be subject to all the movements of such boat, whether vertical, lateral, or undulatory. It does not suggest the idea that the structure is not to be fastened to a boat, and is not to be suspended from a boat, and is not to be subservient to the involuntary movements of a boat, but is, when once put in place on the bottom, to remain there uninfluenced by the involuntary movements of a boat. It does not suggest the idea that the self-adjusting feature of the self-anchors can be dispensed with, and that such self-anchors may be replaced by legs capable of being set at desired lengths, but then necessarily to be deprived of all capacity of self-adjustment.

With this view of the plaintiffs' structure, we are prepared to consider what is alleged against the defendants. The principal defendant, General Newton, is an officer of the Engineers in the Army of the United States, who has, for several years past, been in charge of the operations for removing obstructions to navigation caused by rocks under water in the harbor of New York and in Hell Gate and its approaches. The other defendants have been subordinate to him, he and they being employed and paid by the Government of the United States to do what they have done in respect to the matters alleged against them. Under the direction of General Newton, an apparatus has been used in drilling and blasting subaqueous rocks in the harbor of New York and in Hell Gate. The bill not only contains the usual averments that the use of this apparatus is an infringement of the plaintiffs' patent, and that
336 General Newton caused such apparatus to be constructed and used, but also avers that in planning such apparatus, and in preparing to construct it, General Newton caused drawings to be made, without the knowledge or consent of the plaintiffs, from a model of the invention of Lewis, belonging to the plaintiffs, and that he, in like manner, and in imitating said infringement, caused another model to be constructed from the said model, embodying its principal features of construction, as set forth in the plaintiffs' patent, and that he obtained from the United States Patent-Office, and in like manner used, a copy of the specification and drawings of said patent.

The answer of General Newton denies the infringement alleged, and avers that, during the year 1869, he invented an apparatus for use as a caisson, coffer-dam, and diving-bell, in excavating and taking out rock in the harbor of New York; that it was constructed by and at the expense of the United States, and has since been used exclusively by the United States in the prosecution of the work undertaken by the United States of improving the harbor of New York; that General Newton, being an officer of the United States and a lieutenant-colonel of engineers in the Army of the United States, has been heretofore assigned to the duty of directing the said improvement of the harbor of New York, and, in pursuance of his aforesaid duty, and acting for the United States, has used the said apparatus; that the other defendants, during all the time they or either of them have had any connection with the use of the said apparatus, have been employed and paid by the United States, and have acted in connection therewith solely as employés and agents of the United States; that neither he nor any of the

defendants have derived any profit or emolument from the construction or use of said apparatus; that, in the year 1867, in Boston Harbor, Massachusetts, one George W. Townsend put in operation a method
337 of drilling and blasting rock under water in a rapid tide-way, using therefor a drilling-platform, supported by anchors and adjustable legs, combined with a boat and a system of windlasses, anchors, and chains, together with suitable machinery, by means of which a system of drills might be operated substantially like the apparatus claimed by the plaintiffs; that the apparatus and dam claimed to have been invented by Lewis was not in fact the invention of Lewis, but the same had been invented and described by the defendant Newton prior to its invention by Lewis; that such invention, and a description thereof, were printed and published in a letter from the Secretary of War of the United States to the House of Representatives in the Congress of the United States, dated Washington, February 11th, 1867, containing a report made by the defendant Newton, which gave a full and complete description of said machine so invented by the defendant Newton, together with the mode of constructing and using the same, which said letter and report were, on the 14th of February, 1867, ordered by said House of Representatives to be printed, and were printed and published at Washington, and are known as Executive Document No. 90, House of Representatives, 2d session, 39th Congress; that the said apparatus alleged to have been invented by Lewis was in fact invented by the defendant Newton; and that Lewis unjustly and surreptitiously obtained a patent for the said apparatus, which was in fact invented by said Newton, who was using reasonable diligence in adapting and perfecting the same.

The report of General Newton thus referred to is dated January 21st, 1867. It contains plans and estimates for operations to improve Hell Gate for purposes of navigation. After describing the results attained by blasting by placing charges of powder in position on the rocks without the use of diving-bells or submarine armor, and exploding such charges, the report
338 of General Newton proposes to prepare the surface of the rocks for ulterior operations, by blowing off the sharp points and projections by charges placed in position by divers, until the rock is reduced to a more uniform surface, then to blast the rock by introducing charges into drill-holes made for the purpose, and to remove the débris by divers. The report then proceeds: "The current, which has a maximum velocity of 8.50 miles, limits the time of working under water to a little over two hours per day, during and about the time of slack water, and hence the time and expense, unless some means of shielding the divers and operators from the force of the current can be devised, would prove a serious objection. Even if the persons using the drill were protected from the current, the delay incident to this mode of operations," that is, drilling by divers under water, "would be considerable; but, if the drilling were conducted from the surface of a platform above the water, the same result would be reached as on dry land. A platform of suitable size, with vertical sliding supports, capable of being raised or lowered through a considerable height, is prepared and floated to its position, supported on the decks of two scows or other floats, one on each side. Arrived at the place, the floats are moored, the vertical supports of the platform let down to the bottom, securely fastened to the platform, and braced to each other, if necessary. This operation being done at the top of tide, the scows are floated away when the water falls. The supports to the platform may be placed within ten feet of

each other, and the weight of the platform, to insure steadiness and stability, fixed at any desirable standard. The supports may be lashed above and below the platform to other uprights placed for that purpose, and may be wedged also to prevent working. To avoid the interference of the currents with the drills, these may be made to
339 work in hollow iron cylinders, reaching from the platform to the rock. A steam-engine, or machine worked by hand, can then be applied to the drills, and the work pushed regardless of the currents. To remove the rock blasted, it will likewise be necessary to protect the persons of the divers from the force of the currents, and it is proposed to do this in the following or similar mode: Two cylindrical floats, of sufficient buoyancy, made of boiler-iron, are placed, say, thirty feet from centre to centre. Towards their extremities they are inclined toward each other until they meet, forming one float, say, one hundred and sixty feet long and forty wide. Curtains of iron, extending along the whole outer line of the floats, are permanently fastened at their upper lines to these floats, the lower end of the curtain being attached by falls to davits or small derricks upon the floats, so as to be lowered or raised at will. These curtains are separated into lengths of about twenty feet, that each may be managed independently of the other. The curtains should be flexible, and may be made of plates of iron, say, one foot wide and twenty long, connected with those in contact by hinge-joints. The float being placed in position and moored securely, the curtains, by sections, are let down to the bottom, their extra depth allowing an extent of several plates to rest upon the rock. An interior space of one hundred and sixty feet by forty on the bottom is thus protected, where the divers can fill the buckets, which are afterwards raised and emptied into scows, with valve bottoms, lying alongside. The débris is then towed away and deposited where desirable. There is nothing in these expedients which suggest practical difficulties which skill could not surmount, and confidence is felt that these or similar contrivances can be relied upon to solve this problem. Before work is really undertaken, trials should be made and prosecuted until a good result is obtained. There is no doubt felt that the obstacle in the way, viz,
340 the force of the current, can be neutralized, and it remains only to decide whether the object is worth the money it will cost; a question which it is the privilege of others to determine. * * * Any reasonable hope of effecting this improvement depends upon the rejection of misty and fanciful schemes, which cannot be brought within the rules of ordinary calculation. This report has attempted one method of solution, and it is hoped many better may be found. * * * There is no doubt that a serious and well-considered attempt to push the work will be the means of stimulating mechanical inventions suited to this end, which, with the experience gained from day to day, will not only expedite progress, but also materially diminish the cost, especially in the large item of removing the rock."

In February, 1868, General Newton was asked by the War Department to revise his former estimate, with a view to reducing it, if possible, and he was inquired of whether a much smaller sum than the amount asked for the first year's operations, $900,000, "a large part of which was to be expended in costly machinery, such as current-breakers, &c.," could not be usefully applied the first year in removing, by less expensive means, in whole or in part, the most dangerous of the rocks. In reply, General Newton, on the 11th of February, 1868, said, referring to his report of January, 1867: "The system adopted, after much care, and the reasons therefor, have been very fully given in my report. The

particular machines described by me were not relied upon as the sole or even the best means of effecting the object desired, as my report will show, but their design was to demonstrate that no insuperable difficulty intervened to prevent a practical consummation of the work, and to furnish data for its estimate. One thing became certain, that the boring should be conducted from a platform above water; but whether such platform should be supported upon tripods, or arranged as de-
341 signed in the report, was a matter of small moment. It is quite likely that both systems can be advantageously employed in the same work under different circumstances. * * * It is likely that the current-breakers may be dispensed with, as I have been considering other means of removing the rock from the bottom after blasting."

The ideas thus developed by General Newton are very distinct. The drilling is to be conducted from the surface of a platform above the water, and such platform is not to be a floating platform, but is to be one rigidly connected with the rock to be drilled, and supported by such rock. It is to be substantially a platform drilling on dry land, with water instead of air interposed between the platform and the rock drilled, the platform being rigidly sustained by supports from the rock which is being drilled. Drill-tubes are to extend from the platform to the rock. To protect divers while removing the blasted rock, a space is to be enclosed by a dam or current-breaker, which is to be made by letting down curtains of iron from a float, the curtains being permanently fastened above to the float, and being raised and lowered by attachments to their lower extremity, they being made of plates in sections one above another, flexible by being hinged to each other by joints. There is no suggestion of fastening drill-tubes to the curtains, or subjecting the operation of drilling to the caprice of a floating structure.

Lewis testifies that, having read General Newton's reports from time to time, particularly the one of 1867, setting forth the difficulties of accomplishing anything in submarine drilling in strong currents, he turned his attention to inventing a machine for that purpose. The patent sued on was taken out July 28th, 1868. It discards the idea of a rigid platform supported from the rock to hold the drill-tubes, but adopts the idea of a dam in sections, suspended permanently from a float,
342 and attaches the drill-tubes to the dam. It is in direct antagonism to the ideas developed by General Newton. He proposed to work from the rock in drilling, so as to work as on dry land. Lewis proposed to work from a float in drilling. Newton proposed to use a dam merely to protect divers in removing blasted pieces of rock, and for this purpose a dam in flexible sections, deep enough to lie on the bottom, could well be suspended permanently from a float. Lewis proposed to suspend a sectional dam from a float, and affix the drill-tubes to the dam, and subject the drilling to the contingencies of the movements of the float.

Lewis testifies that in the latter part of July or the first part of August, 1868, he explained his invention to General Newton, and showed him photographs of the four drawings which now form part of the patent, showing a plan of the telescopic dam, and also showed him a model of the dam and the adjustable anchors. General Newton testifies that he never gave any directions to any person to make drawings or sketches from Lewis' model, and that no person, to his knowledge or for his use, made any copies from any model or drawing of any invention of Lewis'.

In August, 1868, General Newton, in his official capacity, published an advertisement inviting proposals to be made for removing the Frying Pan and Pot Rock, in Hell Gate, with bids stating separately the

sum asked for the removal of each, and stating that the contract would not necessarily be assigned to the lowest or to any bidder, and that the time which the bidder proposed to consume in performing the work, as well as the character of his proposed mode of operations, as to practicability, would likewise be considered in assigning the contract. In response to this advertisement, the plaintiffs, in conjunction with another person, put in, in September, 1868, a proposal to remove each of the rocks named, for a specified sum, beginning the work April 1st, 1869, and finishing it in seven months, if their bid should be accepted
343 on or before November 1st, 1868, but they did not set forth the character of their proposed mode of operations.

On the 5th of January, 1869, Lewis obtained a patent for an "improved subsaqueous-drilling machine." The specification of this patent says: "This invention consists in an apparatus designed to simplify the operation of drilling rock under water, as described in my present patent, whereby the telescopic still-water dam is dispensed with. * * * * I have already received letters-patent of the United States for a 'portable and adjustable still-water dam,' issued on the 28th day of July, 1868, and having continued my experiments upon subaqueous drilling and blasting apparatus, have come to the conclusion that, for some situations, at least an apparatus far less costly than the subject of said patent can be constructed without detriment to the efficiency of the mechanism. For instance, the telescopic dam described in said patent was designed mainly for the convenience of the diver, enabling him to descend and insert the charges in all states of the tide. But, considering that not only a row of drills may be substituted for one, but that a number of rows of drills may be used instead of a single row, the present applicant has concluded that the multiplied rows more than compensated for the absence of the telescopic dam, since in the place of going down at any state of the tide, to insert one row of the charges, the diver can descend at slack water, and insert a largely increased number, and all without the costly and comparatively difficult to operate dam described in the patent aforesaid, the tubes in the devices herewith submitted serving the purpose of the dam, so far as the protection of the drills from the force of the current is concerned, the object of the whole apparatus, as now presented, being the performance of the work contemplated, by greatly simplified means, as compared with the mechanism patented as aforesaid." The general character of the ap-
344 paratus in the patent of 1869 is a raft or boat from which spuds or vertical anchors are allowed to slide downward until they touch the bottom. The raft or boat is then, by machinery, raised above the water on the spuds and secured. Drill-tubes are then let down until they rest on the rock. In each tube is a drill, which is allowed to sink to the same depth.

Lewis testifies that the last interview he had with General Newton respecting the use of his invention was in the summer of 1869, and that at that time he showed to General Newton a model of an apparatus with the dam left off, and embodying what is shown in Lewis's patent of 1869, and asked General Newton to adopt it.

Contracts had been made for the removal of some of the channel rocks, and on the 9th of June, 1869, General Newton made a report to the War Department, in which he said, "I propose, in view of ultimate want of success on the part of the contractor and others in the removal of the channel rocks—a contingency which at least is possible—to construct a boat and machine for the Government, the boat to be about 120 feet long and 50 feet beam, in the shape of a scow, with a deck two to

two and one-half feet thick, projecting four feet beyond the hull, and furnished on the edge with iron plating, say, two inches thick. This construction, to stand the shock of collisions, and a well of about 30 feet wide by 40 feet long in the boat, through which to raise and lower the caisson from and to the bottom, constitute the features of the boat; the caisson to be constructed thus:" Then follows a drawing of the caisson, which is represented as dome-shaped, with a conical funnel rising from its top. The report proceeds: "A caisson of the shape of a frustum of a cone, to oppose the same resistance to overthrow, would require to have a base of greater diameter in proportion to height, the above construction being designed so that the ultimate pressure
345 of the water running with great velocity, which is normal to the surface, and falling within the area of the base, will not actually tend to overthrow the machine. The drilling-machines are separate from the caisson and may be changed at will. Of course I do not pretend to say there is not much yet to be learned, but this never will be done unless I set to work."

On the 19th of July, 1869, General Newton filed in the Patent-Office a caveat, sworn to by him on the 14th of July, 1869, for what he called therein "improvements in the mode of constructing a caisson, coffer-dam, and diving-bell, for the purpose of conducting operations in waters with rapid currents." It says, "The invention consists in making a caisson, coffer-dam, or diving-bell of the forms exhibited in figures 1, 2, 3, and 4 of drawing sent herewith, or of other forms readily suggested. The exterior surface may be generated by the revolution of a straight or curved line, or a combination of the two about one or more axes. The point specially claimed is so to form the surface of the machine that the pressure of the current of moving water upon it, being necessarily normal to the surface, shall so fall within the base as to hold the machine to the bottom unaided, or only partially aided, by the weight thereof. The machine can be used to create still water within the space enclosed, in which divers may with facility work, or may be used as a diving bell, or, finally, by closing the space between the bottom of the machine and the bed of the river or sheet of water, and pumping out, may be used as a coffer-dam. When the bed is hard and uneven, movable legs, placed near the bottom of the machine, are let go by the run, and are kept to their bearings by self-acting cams. The use of the cams is not, however, claimed. When necessary, or when the depth of water may require additional help to the machine, connection may be made with the surface of the water by a funnel or pipe, through
346 which to ascend or descend, or convey materials; and this funnel may be fixed to the machine or detached therefrom, and capable of being moved in or out of place. The short curbing represented on the top of the variously formed machines is necessary to prevent the current shooting into the inside and creating disturbance there."

General Newton, with the authority of the War Department, proceeded to construct an apparatus embodying the arrangement set forth in said caveat and in said reports, namely, an iron dome to be sunk on the rock to protect the drills and the divers from the velocity of the current, and, although lowered and raised from a boat, yet disconnected therefrom and uncontrolled thereby when in position, and a series of drill-tubes affixed to and within the dome, in which tubes to work the drills by dropping them by their own weight and raising them by connection with motive power on the boat. The apparatus was first put to experimental use in November, 1870, and was found to

work successfully, and has since been in constant use, effectively accomplishing its object. It is this apparatus the use of which is alleged to infringe the plaintiffs' patent.

In General Newton's apparatus the dome is let down through the well-hole in the boat. If the bottom is uneven, legs or spuds around the lower edge of the dome fall by gravity, until they bear on the bottom in such manner as to ensure the horizontality of such lower edge, and then are prevented from moving by self-acting cams, which hold them permanently in place. The dome is then detached from the lowering apparatus, and becomes a structure erected on and from the bottom of the river, having no suspension from any boat or float above. The drill-tubes are rigidly fixed within and to the dome, and the drills are raised by lifting-engines on the boat, and dropped to their work by their own gravity, working truly and vertically, because
347 of the immobility and horizontality of the dome. The dome and the drill-tubes are unaffected by any motion in the boat, and the attachments to the drills being by loose connections the action of the drills is practically unaffected by such motion, within the range to which it is limited by careful anchorage and by allowing sufficient play between the face of the well-hole and the side of the funnel which projects up from the centre of the dome. The arrangement of General Newton's apparatus is not that of the plaintiffs', because the dome is not, when in position for work, suspended from the float; and because, although General Newton's dome, as originally constructed, had its funnel capable of being adjusted at different heights, it never had its funnel self-adjusting to varying depths of water; and because it has no self-anchors free to slide at all times while the apparatus is in use, and self-adjusting at all times. In all the features heretofore indicated as characterizing the plaintiffs' arrangement, and forming, according to his first and second claims, necessary features in it, the apparatus of General Newton is essentially different, and does not possess such features. Nor does the plaintiffs' apparatus possess the features which made General Newton's apparatus valuable and successful. Each of them has an enclosure and drill-tubes and drills within it. But there the resemblance ceases. They start on different theories, and are constructed on different principles. No apparatus such as the plaintiffs' patent shows has ever been made or used. The evidence is satisfactory to show that the plaintiffs' apparatus would, in use, be entirely worthless. In addition to the suspension of his apparatus from the float, and the subjection of the dam and of the drill-tubes to the movements of the float, the mode of anchoring the dam would, by the leverage of the chain which passes at a right angle through an attachment to the bottom section of the dam, make it impossible to work the drill with useful effect.

348 So far as suspending an enclosure from a float, to protect divers, is concerned, General Newton advanced the idea before Lewis did, as has been shown. But General Newton never suggested that it would answer, in practice, to attach drill-tubes to anything controlled by a float. As regards resting a structure under water on legs extending to the bottom and working drills through such structure, as a guide, that principle existed and was successfully developed in the drilling-apparatus shown to have been used by Townsend in drilling rocks in Boston harbor, in July 1867. A drill-stand under water was supported by legs which rested on the rock. The legs had a sliding adjustment, so as to be fixed to suit the uneven surface of rock. The drill-stand consisted of two horizontal plates, about for feet apart, to the lower one of which the legs were attached. The drills passed through holes in

the two plates, which holes served as guides, and the drills fell by gravity and were raised by power. General Newton adopted the idea developed in this Townsend apparatus, of working from the rock. By using an enclosure to break the force of the current, and making that enclosure carry the drill-guides, he reduced the length of the legs, and made the structure more stable, and placed the drill-guides near the bottom and yet made them rigid, and severed the apparatus from connection with a boat, and, by the shape he gave to his enclosure, he made the force of the current aid in keeping the enclosure down to its place.

As to third claim of the plaintiff's patent, General Newton's apparatus has no anchors connected with his dome by chains which also connect the dome with the boat. This is an essential feature of the combination in the third claim. That claim is, "the combination of the boats, supports, or floats with the dam, as above described, and the arrangement of anchors to hold such boats in position, in the manner and for the purpose described." In order to make the dam a
349 member of the combination, the anchors, which are connected with the boat by chains passed through eye-bolts on the bottom section of the dam, must be included. Such an arrangement of anchors and chains is inconsistent with the principle of General Newton's apparatus, but is consistent with that of Lewis'.

The fourth claim is the "combination of windlasses, chains, and boats with the dam, as above described, so that, by the construction thereof, a series of drills may be operated within and enclosed by the dam, in the manner and for the purposes herein described." Here, again, General Newton has no chains combined with his dome, nor does he operate his drills in the manner described by Lewis. Lewis' drill-grooves are all connected below with the bottom section of the dam, and that is connected with the boat by chains and a hoisting-apparatus, and the upper section of the dam is fixed to the boat, with the other sections hanging from it. This determines that the drills shall be operated in reference to the movements of the boat. On the contrary, General Newton operates his drills in reference to the immovable rock.

The allegations of the bill, so far as they assert that General Newton proceeded, in constructing his apparatus, in intentional imitation of Lewis', are not sustained either as to the intention or the imitation. General Newton appears to have considered Lewis' plan, and to have deliberately rejected it, and to have proceeded on one directly opposite, The latter has proved successful. General Newton, in all he has done, that is complained of in this suit, has acted as an officer of the Government, in its service and for its interest, judiciously, carefully, and without failure. He has not used Lewis' invention. He has done nothing for his own profit. There is nothing developed in the evidence, to warrant the suggestions contained in one of the arguments submitted on the part of the plaintiffs, that General Newton put forth a snare to entrap the unwary, by inviting Lewis to invent an apparatus;
350 that he announced to Lewis his intention of taking and using any patented invention which it might suit his purpose to use in the work; that he did not intend to waste any sentimentality on nice points in relation to the rights of patentees, so long as his own purposes were served, or to allow any scruples to interfere with his taking other people's property for the accomplishment of his own ends; that the infringement complained of was a matter of deliberate intention from the beginning; that General Newton has been robbing a poor man; and that the court has never had occasion to deal with a more unscrupulous, wanton, and cruel infringement. Some ideas are found in Lewis'

patent, which, if worked out in such a manner as to produce a successful practical result, are valuable—a current-breaker enclosing the working drills, and drill guides near the rock, affixed to the current-breaker. But these ideas are so hampered in construction as to make the drill-guides dependent on the boat. General Newton took up, as any inventor had a right to do, the complete invention of Lewis, and, on examining it, found that it proceeded on an entirely wrong principle, if designed to accomplish the result of having a dam to act at the same time as a current-breaker and a fixed support for drill-guides near the rock, and he organized it on a new principle. He took up the apparatus where Lewis left it, and discarded Lewis' arrangement. These views are sustained by the experts for the defendants, General Tower and Professor Peck, and by the other evidence in the case.

A decree will be entered dismissing the bill, with costs.

George Gifford and Thomas P. How, for the plaintiffs.

Charles M. Keller and Henry E. Davies, jr., for the defendants.

351 U. S. circuit court, southern district of New York.

WILLIAM H. CAMMEYER AND SAMUEL LEWIS } *agst.* JOHN NEWTON, WASHINGTON ISETTS, CHARLES Eccleston and William L. Quenin. } In equity.

This cause having come on to be heard upon the bill of complaint herein, the separate answers thereto of the several defendants, John Newton, Washington Isetts, Charles Eccleston, and William L. Quenin, the replication of the complainants to such separate answers and the proofs, oral, documentary, and written, taken and filed in said cause.

Now, after hearing Thomas P. How and George Gifford, esqrs., of counsel for said complainants, and Henry E. Davies, jr., and Charles M. Keller, esqrs., of counsel for the said defendants, and due deliberation being thereupon had, it is ordered, adjudged, and decreed, and this court doth hereby order, adjudge, and decree, as follows, viz:

352 That the complainants' said bill of complaint be, and the same is hereby, dismissed, with costs to the defendants to be taxed.

(Signed) SAM'L BLATCHFORD.

THOMAS P. HOW, Esq.,
Solicitor for Complainants.

SIR: Please take notice that a decree, of which the foregoing is a copy, will be presented to Mr. Justice Blatchford for settlement and signature in the above-entitled action, at his chambers in the United States court-house, in the city of New York, on Friday, the 12th day of June, 1874, at 11 a. m. of that day.

Dated June 10th, 1874.

Yours, &c.,

GEORGE BLISS,
U. S. Atty., Solicitor for Defts.

353 CITY AND COUNTY OF NEW YORK, *ss:*

Robert J. Hillas, being duly sworn, says that he is a messenger in the office of Henry E. Davies, jr., counsel for the defendants in the above-entitled action, and that on the 11th day of June, 1874, he served the within proposed decree and notice of settlement upon Thomas P.

How, esqr., solicitor for the complainants, by leaving a copy of the same at the office of said Thomas P. How, in his absence, with a person in charge of said office.

ROBERT J. HILLAS.

Sworn to before me this 12th day of June, 1874.

L. W. EMERSON,
Notary Public, N. Y. & Kings Cos.

(Indorsed:) U. S. circuit court, southern dist. Wm. H. Cammeyer & o'rs agst. John Newton & o'rs. Proposed decree and notice of settlement.

Due and timely service of a copy of the within proposed decree and notice of settlement admitted this 10th day of June, 1874.

Atty. for Complts.

Filed June 12, 1874. H. E. Davies, atty. for defts.

354 Supreme Court of the United States, in equity.

WILLIAM H. CAMMEYER AND SAMUEL LEWIS
against
JOHN NEWTON, WASHINGTON ISETTS, CHARLES Eccleston, & William L. Quinn } Appeal.

To the honorable the Supreme Court of the United States:

The appeal of William H. Cammeyer and Samuel Lewis, the above-named complainants and appellants, respectfully showeth that, upon the twenty-sixth day of July, 1872, the above-named complainants filed their bill in the circuit court of the United States for the southern district of New York, against the above-named defendants and appellees, alleging, among other things, that the said Samuel Lewis, being a citizen of the United States, was the original and first inventor of a new and useful improved still-water dam, and having made due application to the Commissioner of Patents of the United States for letters-
355 patent thereof, and having assigned all his right, title, and interest in and to said invention to the said William H. Cammeyer, which assignment was duly recorded in the Patent-Office; upon said application and assignment letters-patent of the United States, number 80492, duly issued and signed, and bearing date the twenty-eighth day of July, 1868, were in due form of law granted, issued, and delivered to the said William H. Cammeyer for the said invention; that afterwards, on the eleventh day of April, 1872, the said Cammeyer, by an instrument in writing duly executed and stamped, assigned to the said Samuel Lewis one equal undivided half part of said invention and letters-patent, and of all rights of action which had accrued by reason of any infringement thereof, which assignment had been duly recorded in the Patent-Office; that the said invention was of great utility; and that the said defendants, after the date of said letters-patent and before the commencement of the said suit, had unlawfully and wrong-
356 fully, in infringement of the aforesaid letters-patent, in the harbor of New York and elsewhere in the United States, constructed and used the machine and still-water dam containing the said invention, and were continuing to use the same, to the great damage of the complainants and to their own profit; that the said bill prayed a discovery of and accounting for the profits and damages arising from the said infringement

and a decree for the payment of the same to the complainants with costs; and also prayed an injunction restraining such infringement, and such other relief as might be agreeable to equity; that afterwards the said defendants appeared by their counsel and filed separate answers to the said bill; that the complainants filed replication to each of the said answers, and testimony on both sides was taken in the said cause; that after a portion of the testimony in the said cause had been taken, the said defendant, John Newton, filed by consent a further and amended answer to the said bill.

And this cause having come on to be heard in the said circuit
357 court, on the 19th day of June, 1874, a final decree was entered in the said cause, wherein it was, in substance, adjudged and decreed, that the complainants' said bill be dismissed, with costs to the defendants, to be taxed.

Wherefore these appellants appeal from the whole of the said decree of the said circuit court of the United States, and respectfully pray that the said decree of the said circuit court, and the bill, answers, pleadings, depositions, evidence, and proceedings in the said cause may be sent to the Supreme Court of the United States without delay, and that the said Supreme Court will proceed to hear the said cause anew; and that the said decree of the said circuit court and every part thereof may be reversed, and a decree made granting to the said complainants the said accounting damages, profits, and costs, and requiring the defendants to pay the same to the complainants, and granting also an injunction against the defendants and each of them; all as prayed for in the
358 said bill, or such other decree as to the said Supreme Court shall seem just.

Dated New York, July 16, 1874.

WILLIAM H. CAMMEYER.
SAMUEL LEWIS.

THOMAS P. HOW,
Solicitor and of Counsel for Appellants.

Appeal allowed.

SAMUEL BLATCHFORD, *D. J.*

July 22, 1874.

(Endorsed:) Supreme Court of the U. S. Cammeyer vs. Newton. Petition of appeal. Filed Aug. 5, 1874.

359 Supreme Court of the United States, in equity.

WILLIAM H. CAMMEYER AND SAMUEL LEWIS, *against* JOHN NEWTON, WASHINGTON ISETTS, CHARLES Eccleston, and William L. Quinn. } Bond on appeal.

Know all men by these presents that we, William H. Cammeyer, of 99 Lee avenue, Williamsburgh, N. Y., John E. Cammeyer, of 152 Nassau street, Brooklyn, N. Y., & Alfred J. Cammeyer, of 152 Nassau st., Brooklyn, are held and firmly bound unto John Newton, Washington Isetts, Charles Eccleston, and William L. Quinn, in the sum of eight hundred and fifty dollars, to be paid to the said John Newton, Washington Isetts, Charles Eccleston, and William L. Quinn, their executors or administrators; to which payment, well and truly to be made, we bind ourselves and each of us, jointly and severally, and our and each of our

by heirs, executors, and administrators, firmly by these presents, sealed with our seals, dated this 16th day of July, 1874.

360 Whereas the above-named William A. Cammeyer and Samuel Lewis have taken an appeal to the Supreme Court of the United States, to reverse the decree rendered in the above-entitled suit by the circuit court of the United States for the southern district of New York:

Now, therefore, the condition of this obligation is such that if the above-named William H. Cammeyer and Samuel Lewis shall prosecute their said appeal to effect and answer all costs if they shall fail to make good their appeal, then this obligation shall be void; otherwise to remain in full force and virtue.

WILLIAM H. CAMMEYER.
JOHN E. CAMMEYER.
ALFRED J. CAMMEYER.

Sealed and delivered in presence of—
JOHN A. SHIELDS.

UNITED STATES OF AMERICA,
Southern District of New York, ss:

John E. Cammeyer and Alfred J. Cammeyer, the sureties on the foregoing bond, being severally duly sworn, depose and say that they are severally residents of the city of Brooklyn and freeholders in the

361 State of New York, and each of them respectively worth sixteen-hundred dollars over and above all debts, dues, demands, and incumbrances whatever, besides property exempt by law from execution

JOHN E. CAMMEYER.
ALFRED J. CAMMEYER.

Sworn to before me this 16th day of July, 1874, as to John J. Cammeyer; and sworn to before me this 17th day of July, 1874, as to Alfred J. Cammeyer.

JOHN A. SHIELDS,
U. S. Commissioner, S. D. of N. Y.

UNITED STATES OF AMERICA,
Southern District of New York, ss:

I hereby certify that before me personally came John E. Cammeyer and Alfred J. Cammeyer, sworn to me to be the persons described in and who executed the foregoing bond, and severally acknowledged that they executed the same.

JOHN A. SHIELDS,
U. S. Commissioner, S. D. of N. Y.

The foregoing bond is approved as to form and amount and the sufficiency of the sureties.

SAM'L BLATCHFORD.

JULY 22ND, 1874.

362 (Endorsed:) Supreme Court of the U. S. Cammeyer vs. Newton. Bond for costs on appeal to Supreme Court U. S. Filed Aug. 5, 1874.

363 Supreme Court of the United States, in equity.

WILLIAM H. CAMMEYER & SAMUEL LEWIS, complainants and appellants,
against
JOHN NEWTON, WASHINGTON ISETTS, Charles Eccleston and William S. Quinn, defendants and appellees.

It is hereby consented that the models, exhibits, and all other matters of evidence not contained in the printed record in the above-entitled cause, be and remain in the custody of the solicitors for the respective parties herein, until the hearing of the in this cause, then to be produced before the Supreme Court, and thereafter to be returned to the circuit court of the United States for the southern district of New York; and we join in requesting said circuit court to make an order to that effect.

Dated New York, August 5, 1874.

GEORGE BLISS,
U. S. Atty. for Defts.
THOS. P. HOW,
Solicitor for Complainants.

364 On reading and filing the foregoing stipulation, ordered that the models, exhibits, and all other matters of evidence not contained in the printed record in the above-entitled cause, be and remain in the custody of the solicitors for the respective parties herein until the hearing of the appeal in this cause, then to be produced before the Supreme Court, and thereafter to be returned *to be returned* to the circuit court of the United States for the southern district of New York.

September 23d, 1874.

(Signed) SAM'L BLATCHFORD.

(Endorsed:) Stipulation. Filed Sept. 24, 1874.

365 By the honorable Samuel Blatchford, judge of the district court of the United States for the southern district of New York, and a member of the United States circuit court of the said district.

To John Newton, Washington Isetts, Charles Eccleston, and William L. Quinn:

Whereas William H. Cammeyer and Samuel Lewis have lately appealed to the Supreme Court of the United States from a decree lately rendered in the circuit court of the United States, for the southern district of New York, made in favor of you, the said John Newton, Washington Isetts, Charles Eccleston, and William L. Quinn, and have filed the security required by law, you are therefore hereby cited to appear before said Supreme Court at the city of Washington, on the second Monday of October, 1874, to do and receive what may appertain to justice to be done in the premises.

Given under my hand at the city of New York, in the southern district of New York, in the second circuit, the 22nd day of July, in the year of our Lord one thousand eight hundred and seventy-four.

SAM'L BLATCHFORD.

366 (Endorsed:) Supreme Court of the U. S. Cammeyer vs. Newton. Citation.

Service of a copy of the within citation is hereby admitted.
August 5th, 1874.

GEORGE BLISS,
U. S. Attorney & Solicitor of Appellees.

Filed August 5, 1874.

367 UNITED STATES OF AMERICA,
Southern District of New York, ss:

I, Kenneth G. White, clerk of the circuit court of the United States of America, for the southern district of New York, in the second circuit, do hereby certify that the foregoing pages, numbered from one to 366, inclusive, contain a true and complete transcript of the record and proceedings had in said court, in the case of William H. Cammeyer et al. against John Newton & others as the same remain of record and on file in said office.

In testimony whereof, I have caused the seal of the said court to be hereunto affixed, at the city of New York, in the southern district of New York, in the second circuit, this eighth day of October, in the year of our Lord one thousand eight hundred and seventy-four and of the Independence of the said United States, the ninety-ninth.

KENNETH G. WHITE, *Clerk.*

(Indorsement on cover:) No. 114. William H. Cammeyer and Samuel Lewis, appellants, vs. John Newton, Washington Isetts, Charles Eccleston, and William L. Quinn. S. New York. C. C. U. S. Filed 10th October, 1874.

O

Supreme Court of the United States,
on appeal from the

United States Circuit Court,

SOUTHERN DISTRICT OF NEW YORK.

In Equity.

WILLIAM H. CAMMEYER, et al,

vs.

JOHN NEWTON, et als.

and appellants.

ARGUMENT ON THE PART OF COMPLAINANTS,

By THOMAS P. HOW.

NEW YORK:
JOHN POLHEMUS, PRINTER, 102 NASSAU STREET.
1874.

Supreme Court of the United States,
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Supreme Court of the United States
on appeal from the

U. S. Circuit Court,

FOR THE SOUTHERN DISTRICT OF NEW YORK.

[*In Equity.*]

WILLIAM H. CAMMEYER and SAMUEL LEWIS

against

JOHN NEWTON, WASHINGTON ISETTS, CHARLES ECCLESTON and WILLIAM L. QUINN.

BRIEF FOR COMPLAINANTS,
and appellants.

This suit is brought by bill in Equity for an injunction, and for profits and damages for the infringement of the Letters Patent of the United States, No. 80,492, granted to the complainant Cammeyer, as assignee of the complainant Lewis, for the invention of "a new and useful improved portable and adjustable still-water dam," as it is termed in the patent; one equal undivided half part of which invention and patent, together with a like interest in all accrued rights of action, was assigned to the complainant Lewis by the said Cammeyer previous to the commencement of this suit.

It appears, from the evidence, that in 1867 the defendant Newton made a report to the Chief of Engineers, by letter of January 21st of that year, in regard to the removal of rock in the harbor of New York, in which he speaks despairingly of the removal of the channel rocks by any of the means then known, and expresses the hope that many better methods than the one he suggests

as occurring to him may be found for the solution of this difficult problem, and predicts that, without doubt, a well considered attempt to push the work will be the means of stimulating mechanical invention suited to that end.

This report was published, and, in response to it, the complainant Lewis, supposing this appeal to inventors to be made in good faith, and not suspecting it to be a snare to entrap the unwary, applied his inventive powers to the work, and in 1868 invented and patented the invention for the unlawful construction and use of which this suit is brought.

It appears further from the testimony of the complainant Lewis, supported by that of the complainant Cammeyer, and not contradicted by the defendant Newton in his own testimony, that, about the time of the grant of the patent, and subsequently, several interviews took place between them, in which Lewis described his invention to Newton, and requested him to recommend it to the Government, so that he might get it adopted, which Newton refused to do; but finally, at the last of these interviews, and after he had gained from Lewis a complete knowledge of the invention, announced to him his intention of taking and using any patented invention which it might suit his purpose to use in the work.

(Complainant's testimony, p. 50.)

Of course, this announcement does not constitute an infringement of the patent, but it foreshadowed one, and indicated very clearly that the defendant Newton did not intend to waste any sentimentality on nice or other points of honor in relation to the rights of patentees, so long as his own purposes were served, nor to allow any scruples to interfere with his taking other people's property for the accomplishment of his own ends. This announcement gives the key to the whole transaction, and indicates with unmistakable force, that the infringement now complained of was a matter of deliberate intention from the beginning.

It further appears that June 9, 1869, nearly a year after these interviews commenced, the defendant Newton, by let-

ter of that date, announced to the Chief of Engineers his intention of constructing an apparatus for the removal of the channel rocks, as may be seen by reference to pages 392, 393 of the report of the Chief of Engineers for that year.

This letter describes two, and only two, parts, namely—an iron clad scow with a well hole in the center, and a caisson, which latter is represented by an engraving; care being taken to show this caisson, as extending above the surface at high water, and without any provision for adjustment of its height.

Nothing is said in this letter about the origin of this proposed construction, and, from the tone of this communication, it might well be inferred that Newton had found it in the domain of mechanical devices open to the public, and not protected by patent, or that he had himself invented it. In his allusion to it, in his letter of September 22, 1869, page 388 of the same report, he represents it as being a machine of his own invention.

It appears further that he thereupon did proceed to construct—not exactly the device as suggested and shown in his letter of June 9, 1869, but the machine now complained of, in which, as we shall show presently, he embodied every one of the improvements claimed in the patent of the complainants in 1868, which machine was completed, or so far completed as to be sent out on trial on the rocks, January 3, 1870, as appears from his letter of that date to the Chief of Engineers, which letter clearly conveys the ideas that after patient waiting for the inventors of the country to produce some device in response to his appeal of 1867, which should be capable of successfully performing the work, they had failed to do so; that he was therefore obliged to take the responsibility of invention upon himself, and that the machine thus constructed was his own invention; that his conception of the idea was long delayed, for the reason that inventive ideas come when and how they will, so that it was only in the May previous that even the general character of the apparatus was developed; and all this, too, notwithstanding, as we have seen, Mr. Lewis had described his invention to him in 1868. No credit whatever of the

invention is given to Mr. Lewis in this letter, and there is nothing in it to indicate that any portion of it was invented by any other person than himself, or at any earlier date than May, 1869.

In September, 1871, he makes a further report to the Chief of Engineers in regard to the operation and success of this machine, from which it appears that it had been used in the reduction of Diamond and Coenties reefs, and winds up his report by saying that "the steam drilling scow has fully proved its ability to perform good work." The importance of the invention under consideration is sufficiently indicated by the facts that defendant Newton, in his letter of January 21, 1867, already alluded to, sets forth three projects for the improvement of Hell Gate, and in the second of these projects he estimates the average cost of removing rock at $\$1\frac{64}{100}$ per cubic foot—equal to $\$44\frac{28}{100}$ per cubic yard—as may be seen on pages 738, 728 of the report of the Chief of Engineers for 1868, and page 437 of the report of the Chief of Engineers for 1870; and the total cost for the whole improvement, giving a depth of 26 feet at mean low water, at nearly nine millions of dollars, and for a depth of 24 feet at nearly eight millions of dollars; but in his estimate of January 3, 1870, after this machine was constructed, he says he is justified in stating positively that the average cost will not exceed $20 per cubic yard, and it is highly probable will not exceed $15. And the entire cost, for a depth of twenty-five feet at mean low water, is reduced in this estimate to a little over four millions of dollars, as may be seen on page 437 of the report of the Chief of Engineers for 1870. That this radical reduction of the estimated cost of the work (perhaps the most remarkable reduction in modern times of the cost of any work whatever) was due chiefly, if not entirely, to the machine now complained of, is evident from the fact (among other things) that the greatest decrease in the estimates is found in the second project, which involves the removal of a greater portion of the channel rocks, as we may see by reference to pages 437, 438 of this report, which rocks this machine was specially designed to remove.

Had any new discoveries been made in the principles and practice of submarine blasting, or submarine removal of rock, aside from the machine in controversy? There is not even any such pretense; but the truth was, as appears from the evidence, that the defendant Newton had caused to be constructed and put in operation the machine for the construction and use of which this suit is brought. In the early part of 1872 the complainants became satisfied that the defendant Newton was using the invention secured to them by the patent of July 28, 1868, on which this suit is brought, in which he was aided by the other defendants in this suit, and after calling upon them for settlement, and receiving no satisfaction, this suit was commenced in July of that year.

An attempt is now made on the part of the defendants to show that the machine patented was not capable of efficient operation, and also that some of the devices claimed in the patent are not necessary. *Since* the complainants have asserted their rights and indicated their intention of maintaining them, the defendants have wonderfully discovered (as the fox in the fable did of the grapes) that some of these features of the invention are not desirable—a discovery very often made by infringers of patents when called upon to account for their piracies of other people's inventions.

It is also claimed on the part of the defendants that the invention, or some portion of it (and it is difficult from the evidence to say exactly what portion), was not new when patented, and was not first invented by Mr Lewis; but the proofs on this point are so utterly wide of the mark, that I apprehend the time of the Court need not be long occupied upon this portion of the defense.

Having thus briefly given an epitome of the history of the case, we now propose to show—

I. What Mr. Lewis' invention was, and the objects and results of the said invention.

II. What is claimed in the patent as his invention.

III. Compare the machine used by the defendants with the invention described and claimed in the patent.

IV. Show the fallacy of the positions thus far assumed by the defense.

I. What Mr. Lewis' invention was, and its objects. :

In considering these questions, it is important to first examine the nature of the work to be performed, and the difficulties in its performance which were to be overcome.

In a tideway or other current, one of the chief difficulties encountered in submarine operations arises from the current itself, the force of the current, if at all rapid, seriously interfering with the work of the divers, and, in fact, with nearly or quite all of the operations connected with the work, and up to the time of Mr. Lewis' invenvention this difficulty was painfully appreciated by the defendant Newton, as we may learn from his reports to the Chief of Engineers, dated respectively January 21, 1867, and February 11, 1868, which are in evidence, and may be found on pages 727–739 of the report of the Chief of Engineers for 1868. Referring to page 736 of this report, we find the following language used by the defendant Newton, in speaking of the channel at Hell Gate : "The current, which has a maximum velocity of 8.50 miles, limits the time of working under water to a little over two hours per day during and about the time of slack water, and hence the time and expense, unless some means of shielding the divers and operators from the force of the current can be devised, would prove a serious objection."

And again, turning back to page 735, he says :

"The uncertainty and slowness attending blasting under water has had the effect of diverting public attention from that consideration of Hell Gate to which the importance of the improvement is really entitled," &c.

Then again, on pages 738, 739, he says :

"Any reasonable hope of effecting this improvement depends upon the rejection of misty and fanciful schemes which cannot be brought within the rules of ordinary calculation. This report has attempted one method of

solution, and it is hoped many better may be found. It was necessary, in framing the estimate, to make just and liberal allowances, and to provide for contingencies and accidents attending operations not only difficult in themselves, but also little assisted by data derived from any source. On the other hand, there is no doubt that a serious and well considered attempt to push the work will be the means of stimulating mechanical inventions suited to this end, which, with the experience gained from day to day, will not only expedite the progress, but also materially diminish the cost, especially in the large item of removing rock."

In this report of January 21, 1867, the defendant Newton suggests appliances by which he thought the work could be done, and submits an estimate, and he goes on to say, on page 738:

"The cost from this estimate of blasting and removing each cubic foot of rock is $1.64, which is equal to $44.28 per cubic yard."

Throughout this report he speaks of the known appliances and means as inadequate and inefficient, and remarks deploringly of the money which had theretofore been expended in their use in that work, and the meagre results they had accomplished. It will be apparent, from a moment's reflection, that not only the divers must be protected, but also the drills, for it will be obvious, from a moment's consideration, that no drill could drop truly to its place upon the rock, in a current of that velocity, and of the depth to which it was necessary to carry the work, unless it was in some way protected from the force of the stream; and this is, in effect, shown by the statement of the defendant Newton, in his report above referred to, in which he says that the "current limits the time of working under water to a little over two hours per day."

Such were some of the difficulties to be encountered, and necessities of the work to be done, as shown by the defendant Newton's own reports, when the fertile brain of Mr. Lewis undertook their solution. Coffer dams were well known, but to build one around each rock to

be operated upon would require untold and entirely inadmissible expense. Diving bells were as well known, but for the accomplishment of that work were not efficient. Mr. Lewis conceived the idea that a portable enclosure or dam, capable of protecting operations at the precise point where they were being performed, and also capable of being removed to and used on different rocks, or different parts of the same rock, would be a step in the right direction. But then the depth of the water on different rocks which would require operations was very different, and even on the same rock would vary with the state of the tide and the progress of the work; hence it was important to provide means for adjusting the height of the dam to meet these contingencies, or else, either in shoal water the dam would project too far above the surface of the water to be convenient, and would interfere with operations, or, on the other hand, in deep water the top of the dam would be below the surface of the water, and allow the current to flow over it and interfere, somewhat at least, with the operations to be performed. To get rid of this difficulty, Mr. Lewis made his dam in sections, in such a way that the whole height was adjustable, to allow, within reasonable limits, for different depths of water, and these sections were made telescopic, or, in other words, so as to slide one within another. It was also conceived important to provide means for preventing the dam from being slid out of place along the rock by the current, and this Mr. Lewis provided for by attaching a series of spuds, or, as he terms them in his specification, "self-anchors," to the lower section of his dam, in such a manner that when the dam was let down into position for work, these self-anchors would drop into any crevices or depressions they might find in the rock, and prevent the dam from sliding upon it.

Then it was necessary to provide for the use of drills within this dam and protected by it, and to this end he attached a drill-frame to his dam, near the rock, so as to guide the drills and keep them in their places at a point in proximity to the rock. This drill-frame was attached to the lower section of the dam.

Then to operate these drills from above water, he pro-

vided a boat, or boats, or float, which not only gave another support to the drills or their shafts, near their upper ends, but also furnished a deck to work from, and a floating support, on which, or by the support of which, the dam could be hoisted from the rock and floated to another position, and it was also provided with windlasses for doing this work.

Then, to give stability of position to the boats or float, Mr. Lewis combined with this dam and these floats four anchors—one at each end of the boat or float, and one at each side—by which the boats or float would be held in four directions. In the form of construction described and shown by Mr. Lewis, in his patent, the top of the dam is connected to the deck of the float, so that securing the float in position also gave additional steadiness to the top of the dam. To still further secure the bottom of the dam from displacement, and make assurance in that respect doubly sure, Mr. Lewis ran extra chains from his anchors through rings at the bottom of the dam, and from thence to the deck of his boat or float.

Such are some of the principal features of the apparatus devised by Mr. Lewis, the details of construction of which will be found more fully set forth in the specification and drawings of the patent itself.

II. What is claimed in the patent as the invention of the complainant Lewis?

The language of the first claim of the patent is:

"1. The construction and arrangement of a portable and adjustable dam, in sliding or telescopic sections, in the manner and for the purposes herein described."

The purposes referred to in the patent as relating to this feature of the invention are the protection of operations inside of the dam for the drilling and removal of rock, and the adaptation of this protection to different depths of water. Very great effort has been made on the part of the defense to show that the intention of this improvement was to produce still-water, and that if in a device claimed to be an infringement the water was not still, there was no infringement. But it must be apparent

to any one, upon even a very slight inspection of the patent, that *absolute* stillness of the water inside of the dam could never have been contemplated by any one. Even the very drawings which form a part of the patent show (and no doubt purposely) depressions in the rock through which the water would and necessarily must enter from the outside underneath the dam, and no person of any intelligence can fail to know that this must produce some motion of the water inside of the dam. The term, "still-water," where it occurs in the patent, must, therefore, be understood not as an absolute, but as a relative term—not as meaning water which has absolutely no motion whatever, but as having relation to such a checking of the current as will facilitate the operations above referred to within the dam.

This being the case, we next come to consider the meaning and effect of the words, "in the manner," as used in the claim. Do these words mean that the *details* of construction and arrangement must be followed to the letter, or do they only mean that the construction and arrangement should be substantially the same, in view of the resultant effect and the substantial means of its production. If they were to mean the former, scarcely any patent having these words in its claims would be of any value, because there is scarcely any device in which some of the details of construction might not be modified, or even omitted, without at all changing the result or the essential character of the device itself. And before proceeding to the consideration of these claims in detail, it may be well to consider an important principle in the construction of the words "in the manner set forth," or "as described," or words of like import, whenever such words occur in a claim. And our proposition is, that when such words occur in a claim, they are to be construed with reference to and in view of the avowed and apparent objects of the invention; for it is evident that a given device may be substantially the same as another given device for the accomplishment of one given purpose, while it would be substantially different from it for the accomplishment of some other purpose. The broad and settled principle of law is, that where the same

result is produced by means substantially the same, the invention is the same; and by means substantially the same, we understand means substantially the same for the accomplishment of that purpose, and not means which would be substantially the same for every other purpose which the mind of man might conceive.

Taking, then, the object to be accomplished, namely, the checking of the current to protect the work, and the means of its accomplishment, namely, the construction of the dam in sliding or telescopic sections, and arranged to pass one within another, to increase or diminish the height of the dam, and we have a solution free from difficulty, and one which does justice alike to the inventor and the public.

The second claim is as follows:

"2. The combination of the self-anchors 3 with the dam, in the manner and for the purpose herein described."

The only question which seems likely to be raised on the construction of this claim is, whether the claim is to be understood as only having reference to a dam made in sliding or telescopic sections, as recited in the first claim, or on the other hand is to be regarded as having reference to a subaqueous dam or enclosure, adapted to break the force of the current at the point of operations, and forming the same combination in every essential particular with these self-anchors as that described in the patent.

These self-anchors 3, referred to in this claim, are bars of iron, fitted to slide vertically in sockets attached to the lower part of the dam, and being so arranged that their lower ends shall drop down below the bottom of the dam, and take hold of depressions in the rock; the purpose being to prevent the dam from slipping out of place upon the rock. It is not apparent how this purpose, or the mode of its accomplishment, can be affected by the question whether the dam is made of a single section or a plurality of sections. The same result—that of preventing the dam from slipping out of place upon the rock—would be equally accomplished in the one case as in the other, and the means of reaching this result—the com-

bination of the self-anchors with the dam would be identical in both cases, and would operate in exactly the same way. The result is the same, and the means the same in both cases, and we take the ground that it makes no difference, so far as this claim is concerned, whether the dam is made in one section or several. This is the view taken by the expert, Renwick, examined on behalf of the complainants, as we may see from his testimony, and it certainly seems to be reasonable. (Renwick's testimony, question 5, pages 57–59 of the complainants' tesitmony.)

If, however, the opposite view were taken, it would not affect the question of the infringement of this claim, as we shall see when we come to examine the construction of the defendant's machine. Considerable stress was laid on the cross-examination of the complainant's experts upon the fact of the words "the dam" being used in this and the subsequent claims, instead of the words "a dam," as supposed to indicate that this and the subsequent claims were to be limited in their construction to a telescopic dam; but this conclusion can scarcely follow, when we consider that in no case could it be assumed that these self-anchors were intended to be applied to all dams, such, for example, as mill-dams, or other permanent dams, to which they evidently would be entirely inapplicable, but only to a portable dam, adapted to being removed from one place to another, and requiring to be held in position in each place while in use. In this view the words "the dam" become obviously entirely appropriate in this connection, while in the same view the words "a dam" would be entirely inappropriate, and would fail to express the true meaning and intention of the claim. The words "the dam" may also be regarded as appropriate to refer to a dam having, so far as the characteristics and functions of the combination are concerned, the same capacities for the performance of the same functions in the combination.

Our position is, then, that the words "the dam," in this second claim, mean a dam such as described in the patent in all the respects necessary to the performance of its functions in the combination, and no more; and that it does not of necessity require that the dam should

be made in sections to fulfill the conditions of this claim.

The third claim of the patent is:

"3. The combination of the boats, supports or floats, with the dam, as above described, and the arrangement of anchors to hold such boats in position in the manner and for the purposes described."

We have already considered the bearing of the use of the words "the dam" in a similar connection in the second claim, and it is not necessary, in discussing this third claim, to repeat what we have already said on the same subject.

In regard to the other points involved in this claim, it may be sufficient to refer to the testimony of the witness Renwick, pages 24, 25, 58 and 59 of the complainants' testimony, and also to the answer of the witness Hicks to question 10, page 93 of the same record.

As already suggested, it is not necessary, that every detail of construction should be followed so long as the essential features are retained, having in view the result to be accomplished.

It is proper to observe, here, also, that the arrangement of anchors, referred to in the claim, is that for "holding such boats in position," and has no relation whatever to the additional use of the same anchors for holding the *dam* in position.

The fourth claim is:

"4. The combination and arrangement of windlasses, chains and boats with the dam, as above described, so that by the construction thereof a series of drills may be operated within and enclosed by the dam, in the manner and for the purposes herein described."

Here we have in the claim itself not only a statement of the purpose of this part of the invention, but also a special explanation, so to speak, of the nature and extent of the claim itself, in addition to the already sufficient explanation in the body of the specification. It states this part of the invention to be the combination and arrangement of these parts as described, and then goes on

to state in view of what purpose, and to the accomplishment of what end, they are to be combined and arranged as described. An arrangement, then, which is substantially the same *for this purpose*, comes within the claim, though for another and entirely different purpose, it might be materially different, and this is an important consideration in considering the meaning of the claims of almost every patent, where the words "as described," or "substantially as set forth," occur.

We come now to

III. Compare the machine of the defendants with the invention described and claimed in the patent.

In the first claim we have, as we have already seen, a portable and adjustable dam, made in sliding or telescopic sections, and so arranged that the height of the dam may be increased or diminished by the passage of one section within the other.

Here, in Exhibit D, which is stipulated to be a model of the defendant's machine, we have a portable and adjustable dam for the same purpose, and designed for and used in the performance of the same work, which dam may be properly said to be composed of three sliding or telescopic sections, arranged in the manner described in the patent, that is to say, so that the result of increasing or diminishing the height of the dam may be accomplished by the same means, namely, that of sliding or passing one section within the other.

We have here, in this model of the defendants' machine, a lower section, which is frequently called "the dome" in the testimony, next an intermediate section which has been very generally termed in the testimony "the cylinder," and the third and upper section is formed of the boat itself.

The forms of these sections are somewhat varied from the form represented in the drawings of the patent; but it is obvious that these forms may be varied *ad infinitum*, and still the same result, namely, that of increasing or diminishing the height of the dam, be accomplished by the same means, namely, by raising or lowering one section in another.

The two lower sections of the defendants' dam are provided with a set of racks and pawls, by which, if desired, the two lower sections may be fixed or secured, for the time being, at any desired adjustment; but would anybody undertake to say that, by attaching racks and pawls to the two lower sections of Mr. Lewis' dam, so that they can be secured for the time being in any particular adjustment, a person thereby becomes vested with the right to use his invention because he has simply made this addition to it?

The upper section is formed of the boat itself, but would it make any substantial difference in Mr. Lewis' invention if, instead of hanging the upper section of his dam to the deck by links, he had bolted it fast to the deck, or even made it a part of his boats? And this upper section so made might extend to the bottom of his boat, support or float, or lower, and its principle and mode of operation in producing the result sought and attained by the invention under consideration, would be substantially the same, and the same as in the patent. It is simply one of the many modifications which might be made in the form of construction of the same invention. What possible difference could it make, so far as the operation of this upper section of Mr. Lewis' dam is concerned, in regard to the question of this upper section operating as a part of a dam or breakwater, or, in other words, as a protection for the work? The object to be accomplished by this upper section was to check or break the force of the current at this upper part of the entire dam, and it could certainly make no difference, as regards the question of the production of this effect or its operating as an enclosure, whether it consisted of a thin shell of iron or was co-extensive with the boat itself. In the construction shown in the patent, the boats, 1, 1, extend down as low as the bottom of the upper section of the dam, and in case of any lateral current must necessarily act practically as a part of the dam, in checking the force of such current. But suppose these boats were brought up in close proximity to the side of this upper section, or, to go a little further, were made to constitute a portion or the whole of this upper section of the dam,

to state in view of what purpose, and to the accomplishment of what end, they are to be combined and arranged as described. An arrangement, then, which is substantially the same *for this purpose*, comes within the claim, though for another and entirely different purpose, it might be materially different, and this is an important consideration in considering the meaning of the claims of almost every patent, where the words "as described," or "substantially as set forth," occur.

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what possible difference could that make as to the practical result which would be accomplished in both cases?

Turning again to Exhibit D, let us suppose the walls of the well-hole of the boat to remain precisely as they are, but instead of a scow completely surrounding this well-hole and built against it, we have precisely the same form of boats shown in the patent; would anybody then contend that this well-hole did not form a part or upper section of this dam or enclosure? And yet, what possible difference could it make, so far as the fact of the existence of the enclosure at this point and its checking of the current are concerned? What defendants have done in this case, so far as this upper section is concerned, is to make it larger than the section next below it, so that it will rise and fall with the tide outside of this section next below it, and to build their boat around this upper section and make it a part of it.

And on this point we refer to the testimony of Mr. Renwick, pages 23, 24, 53, 63 of complainants' testimony, testimony of Mr. Hicks, pages 91, 92, 95, 96, 102, 103. The combination of the dome and cylinder in Exhibit D, is, then, clearly an invasion of the patent, and constitutes an infringement, irrespective of the section formed by the sides of the well-hole of the boat. From the 29th cross-question put to the witness Hicks, we are led to suppose the defence inclined to assume the position that the well-hole in Exhibit D forms no part of the combination of sections constituting the telescopic dam, because it is not in contact, or, in other words, directly connected to the other sections, namely, the cylinder and dome; and although the cylinder and dome, as we have already seen, constitute a perfect infringement of this claim, we may nevertheless properly discuss this point also.

The term "combination" is not used in this claim, and if it were, we understand the term "combination," as used in mechanics, to mean such a relation of two or more parts or things that they are capable of co-operating to produce a result.

Two parts may be in the most intimate connection and union with each other, and yet their union may be sim-

ply an aggregation, and not a combination of parts, because they may not in any sense co-operate to produce any result, either general or special; and on the other hand, two parts may be out of contact with each other, and yet, by their co-operation, or, in other words, by their combined action, produce an effect to which both are essential, and which neither can produce without the other. Take, for example, the latter class—the wire cloth and the coucher in the common Foudrinier machine for making paper. They do not touch each other, but are separated from each other, say some four to six inches; and yet they not only co-operate to produce their combined result, but are both vital to the success of the machine, and the production of paper thereby. For all practical purposes they might be hung in separate frames, run by separate engines at corresponding speed, and connected only by the earth we tread, and, when in use, by the material to be operated upon, and yet co-operate as a combination to produce the same results they now produce, and in the same way. So in the present case, this upper section formed by the sides of the well hole of the boat co-operates to produce still water, and is as much a part of the dam as if connected rigidly or otherwise to the lower section.

The second claim of the patent is:

"2. The combination of the self-anchors, 3, with the dam, in the manner and for the purposes herein described."

Here we have the same self-anchors combined with the dam in the model Exhibit D, and quite as well adapted to accomplish the same purpose, namely, that of preventing the dam from slipping out of place upon the rock, and if anything was necessary to show that they were designed to effect this purpose, their pointed form shows this most clearly. The clamping device, shown in this model in connection with these bars, certainly does not tend to reduce their efficiency in this respect, but rather enhances it. They are not only combined with the dam in the manner described, but the dam is also a dam made in sliding or telescopic sections, as we have already shown

The combination is too obvious to require comment, and it is scarcely necessary to occupy the time of the Court in demonstrating so self-evident a proposition, which it can hardly be presumed any reasonable man will undertake to dispute.

The third claim is:

"3. The combination of the boats, supports or floats with the dam, as above described, and the arrangement of anchors to hold such boats in position, in the manner and for the purposes described."

Here we have, in Exhibit D, the combination described in the claim as clearly set forth in the answer of Mr. Renwick to question 5, pages 24–26 of the complainants' testimony. Also testimony of Mr. Hicks, question 10, page 93.

The fourth claim is as follows:

"4. The combination and arrangement of windlasses, chains and boats with the dam, as above described, so that by the construction thereof a series of drills may be operated within and enclosed by the dam, in the manner and for the purpose herein described."

Here we have in this model, Exhibit D, the combination of all these parts and their arrangement, so that by the construction thereof a series of drills may be operated within and enclosed by the dam, substantially as specified in the patent, as testified by Mr. Renwick, in answer to question 6, pages 26 and 27, and by Mr. Hicks in his answer to question 11, page 94.

We will now endeavor to

IV. Show the fallacy of the position thus far assumed by the defense. Aside from the denial, in the opening portion of the answer, of any knowledge or information of the invention or patent or their ownership sufficient to ground a belief, the first defense alleged in the answer of the defendant Newton is that the invention in controversy is useless.

The other defendants allege that they have no knowledge or information on this point.

We shall not stop to inquire how the defendant Newton could, in one breath, conscientiously deny all knowledge or information of the invention or patent sufficient to form any belief, and in the very next allege that this very same invention, which he denies knowledge of, is entirely worthless, though this circumstance might possibly give some idea in regard to the value, if not the good faith, of this defense, but shall proceed at once to consider the defense itself.

And in the first place, we remark that the patent is, in itself, *prima facie* proof of the utility of the invention, and unless, therefore, this defendant produces preponderating proof that it is worthless, his defense fails. (*Washburn* v. *Gould*, 3 *Storys*, *R.*, 143, 144; *Troy & Iron Nail Factory* v. *Corning*, 1 *Blatchf.*, 472; *Winans* v. *N. Y. & Harlem R. R.*, 4 *Fisher's Patent Cases*, 7, 8; *Corning* v. *Burden*, 15 *How.*, 270, 271; *Parker* v. *Stiles*, 1 *Fisher's Patent Reports*, 335, 336; *Page* v. *Ferry*, 1 *Fisher's P. C.*, 311.)

Different persons have been examined, on the part of defendants, as experts to prove want of utility of this invention; and in entering upon the consideration of their evidence, it may be well to inquire who these experts are, their relations, or the relations of some of them, to this case, their relations to the defendants, the general character of their testimony, as to fairness and correctness of conclusions and opinions, and generally all that relates to the reliability of their testimony as a guide to this Court on this point; and the pertinence of this inquiry will be quite apparent when we reflect that there is scarcely a subject on which men cannot be found to testify, as experts, to the most preposterous theories and the most absurd conclusions; some, no doubt, honestly, but through ignorance of their business, and some through sympathy with the parties on whose behalf they testify. Such is particularly the case with persons inexperienced in testifying as experts, and it may be properly remarked here that it does not appear that either of the persons examined as experts by the defense have ever given testimony as experts before, and we may add, *sotto voce*, that we think they never ought to again.

The testimony of experts is only useful to the Court when it is reasonable, and when, on the whole, it appears to be reliable.

The first of these "experts," so called, that we propose to notice, is the defendant Eccleston, testifying, of course, as an expert in his own behalf.

In his cross-examination, in testifying in regard to the adjustable connection shown in Exhibit D, between the cylinder and dome, he testifies that he never knew that the object was to run the cylinder up and down in the dome, does not know any object to be gained by such action, and that he can see no practical use for the racks on the outside of the cylinder, and the pawls working into them, as may be seen by an examination of cross-questions 101–103, page 39 of the defendant's testimony. Now, it is scarcely possible to conceive of anything in mechanics that is more obvious and plain than that these racks and pawls were and must have been put there for the purpose of adjusting the height of the cylinder in the dome, and if this witness is unable to perceive a thing so obvious as that, is he a safe guide to this Court in determining any expert question which can possibly arise in this case?

Then again, in answer to cross-questions 212–214, he cannot state positively whether or not the dome or dam in Exhibit D serves to break the force of the current which would otherwise press against the drills or drill-tubes—a question which an intelligent lad of a dozen years would be able to solve on the instant to his satisfaction and correctly.

This witness undertook to testify very learnedly that the current would have a tendency to overturn the dam described in Mr. Lewis' patent, but when he is asked whether the pressure of the current against the upper portion, shown by Exhibit No. 1 (which is an imitation of the form shown in Mr. Lewis' patent), would have that tendency, he does not know!

(Re-cross questions 268–270.)

Again, in his answer to the 44th direct question, in speaking of the construction shown in the patent,

he says the boats or floats would move with the tide, &c., and make it impossible to drill, and clearly conveys the idea in this and other answers, that it would be impossible to drill with the Lewis machine, because the boats or floats cannot be held in a sufficiently fixed position. Now let us see what the defendant Newton says in his report of September 29, 1871, on this very subject, in relation to the boat in Exhibit D (which is certainly as difficult to hold against the current), before this suit was brought or anticipated; and in this report, published in the report of the Secretary of War, part 2, page 726, we find that he there states as follows:

"It has been found perfectly practicable to hold the boat in a position fixed, or at least imperceptibly varied, during the prevalence of the strongest currents in the lower part of the East River." That was the experience of the defendant Newton over eighteen months after the machine went into operation; the opposite conclusion seems to have been an after thought, which, in all charity, we may perhaps suggest was possibly reached after this suit was commenced.

Then, again, in his answers to cross-questions 124–126, this witness testifies that the angular pieces in Exhibit No. 1, which project out from each side of the cylinder, are bolted on to the cylinder with ordinary bolts, and put on and taken off at will; that they are a temporary attachment designed to be taken off when, for any reason, their presence is not desirable, and have been taken off and repaired, and put on again frequently; and that they were put on to strengthen the wooden cylinder; and in his answer to cross-question 131, he says those answers to questions 124 and 125 referred to the wood work as attached to said cylinder, and not to any angular pieces of iron.

Further on in his cross-examination, however, he is pressed with the inquiry whether or not this cylinder, shown in Exhibit No. 1, could not be let down in the dome by simply taking off these angular detachments and changing the position upon the cylinder of the hooks or lugs which support it in the dome. Under the pressure of this question, repeated in various forms, with evi-

dent determination to get a definite answer to it, he now testifies, in his answers to cross-questions 151, 152, 179, 180, that these outside wooden portions were attached to the cylinder by rivets; that he used rivets instead of bolts or wood screws, because they were more handily obtained and not as expensive; that it was a permanent structure, and rivets were more permanent—exactly the reverse of what he had previously testified; and when his attention was called, in cross-question 153, to his previous testimony, that these angular portions were attached to the cylinder by bolts, and is asked to explain the discrepancy, he says that he then referred to the angular pieces of iron shown in the model, and called angle-irons, and that too, though he had expressly stated, in his answer to cross-question 131, that his reference was to the wood work as attached to the said cylinder, *and not to any angular pieces of iron.*

In brief, this witness had deliberately testified to a specific fact, not only generally but precisely, and in addition to that, circumstantially; had given concomitant circumstances, and the reasons why, and then, when it seemed probable, from the direction and persistence of the cross-examination, that the counsel for complainants would make that fact come within an infringement of the patent, has just as deliberately and precisely testified that the same fact was entirely different, and has given the reasons and concomitant circumstances with equal detail and precision, and the one fact and its series of statements are entirely at war with the other.

The next witness examined as an expert on the part of the defense, is Zealous B. Tower.

This witness, when asked, in question 2, if he has any acquaintance or knowledge of the subject of submarine drilling and blasting of excavating rock or other material under water, answers only such as he has learned from conversation with those who have had direction of such submarine blasting, and from some published accounts, and from his answer to the 12th cross-question it appears that the persons from whom he derived this information were the defendant Newton and one J. G. Foster, who has been examined as a witness for the defense

in this case. It appears, also, from his answer to cross-question 14, that the only two machines for submarine blasting with which he is familiar, are the device of Gen. Foster and Exhibit D, built by defendant Newton.

His testimony on this subject may, therefore, perhaps be fairly regarded as a reflection of the views and feelings of these two individuals, rather than as the opinion of an independent expert speaking from his own knowledge and drawing his own conclusions. In question 3 he is asked if he is acquainted or familiar with machines designed and used for the purposes of this work, and his answer is, "What do you mean by familiar? I don't know;" certainly not an answer indicating very great intelligence. This witness goes on through his testimony in speaking of resultants and cosines and resolution of forces, and in stating the elements of these forces he says: "The horizontal element is regarded by writers on the subject of hydrostatics as proportional to the square of the sine of the angle of incidence. The vertical element, according to my recollection, is proportional to one-half of the sine of twice the angle of incidence." Now, why the vertical element should be calculated on a different basis from the horizontal element, if, as he says, in his answer to cross-question 46, "the normal force of the current acting upon the surface is perpendicular to that surface," does not very clearly appear.

In his answer to the 55th cross-question he says: "The horizontal force varies from the base to the top of the dome from unity to zero. The vertical varies from the base of the dome up to an angle of forty-five degrees from zero to unity; from that point to the top from unit to zero. These are ratios. I must correct that last: it is from unity to one-half, and from one-half to zero. This, with reference to the vertical force."

Which of these two statements are correct? And how does it happen that this correction—from unity to one-half—is to be made? Is the witness so utterly at sea in the matter that he must tell us first, deliberately, that the vertical pressure reaches unity at an angle of forty-five degrees, and then tell us it is only half that; or did it occur to him that, according to the principle he had laid

down in his answer to cross-question 46, "the normal force of the current acting upon a surface, is perpendicular to that surface," would bring his unity at an entirely different point—namely, upon the top of the dome? And in either case, how about the statement in his answer to cross-question 55, that the vertical pressure, from an angle of forty-five degrees to the top, is from unity to zero, or, as modified by the last part of his answer, from one-half to zero? For if, as he states, the normal pressure of the current is at right angles to the surface acted on, instead of the vertical pressure decreasing from an angle of forty-five degrees to the top from unity to zero, or from half unity to zero, it ought increase from half unity to unity itself, which this witness, nevertheless, saw was not, and could not be the case; for, if this were so, it would involve the absurdity that a current would exert its greatest force on a plane which was exactly parallel to it, and which, for that reason, could not offer any resistance (except friction) to its onward course. Here is another difficulty. If, as he now says, these resultant forces are in horizontal pressure from unity to zero, and in the vertical pressure from zero to half unity, and then back again to zero, it follows, necessarily, that the horizontal pressure is twice as much as the vertical, and therefore his whole theory about the resolution and direction of these forces falls to the ground, and this witness becomes certainly a very blind guide. Let us follow his theory a little further, and we shall find that it involves another absurdity.

If we examine the tables of natural sines, or even consider a moment without such examination, we shall find that the sine and the co-sine are exactly equal at an angle of forty-five degrees, and multiplying the sine by itself, or the sine by the co-sine, gives us exactly the same results and therefore, according to this witness, the vertical and horizontal pressures at that point must be exactly equal. If this were true, there would be nothing due in the calculation to the direction of the current, but the vertical pressure would be the same at this point as if the current flowed in a direct vertical direction down upon the dome, instead of in a horizontal direction, a proposition which,

I presume, the Court can hardly adopt, and especially in view of the fact that if the direction of the current has nothing to do with the matter, the greatest vertical pressure should be at the crown of the dome, a result which is not even claimed by even this expert.

If this is the science of this witness, and his knowledge depends upon this science and such representations as he has received from the defendant Newton and his witness Foster, of how much value can his testimony be to this Court in determining the scientific questions involved in this case? And is it any wonder that the dome and his theories toppled over together in the experiments made by Messrs. Renwick and Hicks, and testified of by them in their answers to questions 9, 10 and 14, respectively found on pages 61, 62, 96 and 97, in which they testified that a structure made in that form did upset from the force of the current?

The next witness examined on the part of the defense as an expert, is William G. Peck. It would be more satisfactory to read the whole of the testimony of this witness, as that would give a more clear idea of the value of his testimony as an expert, but perhaps due regard for the time of the Court should admonish us to forego this pleasure, and content ourselves with a simple review of some of the points of his testimony.

In his answer to question 5, pages 90 and 91 of defendant's testimony, asking him whether he finds in Exhibit D the invention described in the first claim of the patent, and give his reasons therefor, he says, among other things, in giving his reasons, "Exhibit D is not a dam." Now, stopping right here, is it possible for the Court to see, or for any person to show why Exhibit D is not just as much a dam as that shown in the patent, or in Exhibit E, and in exactly the same sense? True, Exhibit D does not form a water-tight joint upon the rock, and neither does Exhibit E, or the dam shown in the patent—they are both alike in that respect, and both alike are enclosures adapted to check the force of the current, and that is all that either was designed to do, so far as the functions of a dam are concerned. The witness, in the same answer, goes on, immediately af-

ter the words I have quoted, to say, in speaking of "Exhibit D": "It is not portable, in the ordinary sense of the word portable." Here, again, looking at the two structures, it is difficult to see any substantial difference, and it would, perhaps, puzzle a mathematician to tell which was the more portable of the two. If, by the term portable, the witness understood was meant something which an errand boy of moderate strength could carry up-town without fatigue, neither would answer the condition, but if we understand the term as defined by Worcester to mean: "1. That may be carried or transported," or as Webster defines it: "2. That may be carried from place to place." We find that both are portable, and both just about equally so. That this is the sense in which the term portable is used in the patent is so entirely obvious as to require no argument; and it is certainly not calculated to strengthen our belief in any expert to find that he has read the patent so carelessly or with so much prejudice as to give it any other construction. The truth is entirely obvious that both these machines are adapted and intended to be transported from one place to another to perform the work they were designed to accomplish, and the unquestioned proof is from *the defendant's own witnesses*, that the machine represented by "Exhibit D" *has been* so removed from place to place, and used in different localities. It is simply trifling with the intelligence of the Court, then, to represent that one of these machines is portable, while the other is not. And the witness who can do this ought not to complain if he is condemned and banished without further hearing. Either his intelligence must be sadly at fault, or his candor is none of the best.

This witness goes on further to say, in the same answer:

"Neither is Exhibit D constructed and arranged for the purposes described in the Letters Patent which the patentee states to be to produce still water in which to operate for blasting and removing obstructions." Now is it possible for the Court not to see that it does fulfill the very condition, in this respect, that is fulfilled by the

dam described and shown in the patent and represented in Exhibit E, and by substantially the same means—that is to say, by an enclosure around the drills or around the place operated upon, which enclosure is adapted to break the force of the current?

Again, in answer to question 6, asking if he finds in the model, Exhibit D, the invention described in the second claim of the patent, and his reasons, he says, on page 92 of the defendant's testimony: "In Exhibit D there are, it is true, sliding legs not anchors," etc. Now, the Court cannot fail to see that in both cases these bars of iron, by whatever name they may be called, are substantially identical in their structure; that they are hung to slide vertically in their sockets in both cases, and they are adapted and intended to drop down below the base of the dam or enclosure, upon or into inequalities in the rock, as stated in the patent, and that those in Exhibit D are as much adapted to resist lateral pressure as those in the patent.

Again, this witness testified, on his direct examination, that the joint between the dome and the cylinder, in Exhibit D, was not a telescopic joint, because of these racks and pawls which the Court can see were designed and are adapted to hold this joint at any desired adjustment. In cross-question 32, page 100, of defendant's testimony, he is asked to state definitely whether, if the racks and pawls were eliminated from the combination, the joint would be a telescopic joint? and he answers, "I think it would." It will be perceived that this answer is tantamount to an admission that the joint between the dome and cylinder in Exhibit D is a telescopic joint, with the addition of the racks and pawls, and yet it is entirely obvious that this was the only answer this witness could make consistently with his previous answers, and especially in view of the definition of a telescopic joint, which he had given in his answer to question 5, already referred to, and also in his testimony on page 99 of the defendant's testimony. The only obstacle which, according to his definition, prevented the joint in Exhibit D from being a telescopic joint, had been removed by the hypothesis stated in the question, leaving pure and simple

exactly what he had defined as a telescopic joint. Of course there was, therefore, no other answer to give, consistently with what he had previously stated, than the one he did give, that the joint would then be a telescopic joint. But immediately after this answer to the 32d cross-question was given, there was an adjournment from the 11th to the 13th of March, and on re-assembling, the witness completely demolished his answer by adding to it the words, "technically, but not practically." Well, what is the matter now? The witness had got in the hypothesis stated in the question, the exact and genuine telescopic joint he had defined and bargained for in his answer to question 5, and reiterated in his answer to cross-question 25, delivered exactly according to contract without the slightest addition or diminution whatever. Why, then, should the witness say that this joint, which he had himself set forth in his direct examination as the true and real telescopic joint, was only technically so, and that what he had in his testimony represented to the Court as a telescopic joint was not the real thing after all. Why did the witness make this change in his answer, thereby making it so much at variance with the entire spirit of his previous testimony, which, if it means anything, certainly means that a telescopic joint was exactly such a joint as that described in the question? Did it occur to him, during those two days, that his answer made his clients infringers, and showed conclusively, after all, that every time they threw the pawls out of gear and adjusted the telescope in the dome, they had and were using the telescopic joint, and that, too, exactly as defined by himself? But let us look a little further and see whether, in attempting to get out of this dilemma, he at all improves the matter. In the next question, cross-question 33, page 101, he is asked "Why not practically?" and he answers, "Because if the pawls were removed, the upper section would fall down to its lowest position, and inasmuch as there are no provisions made for raising it up while the machine is in operation, it would not be any joint at all for practical purposes." In other words, his testimony on this point amounts to this: that the joint

between the dome and telescope in Exhibit D is not a telescopic joint, because it is provided with a device to hold it in position, and to keep it from falling down to its lowest position, and then, when this obstacle to its being a telescopic joint was removed by the question, it is not, then, a telescopic joint practically, or practically any joint at all, because there is nothing to hold it in position and keep it from falling down to its lowest limit. In brief, it was not a telescopic joint because it had such a device, and then it was not practically a telescopic joint because it lacked it—that is what it comes to, and that is the kind of experting that seems to be guarded as necessary to the defense of this case.

On page 107, commencing with cross-question 50, he testifies that there are rings attached to the upper or cylindrical portion of the enclosure for the drills in Exhibit D, for the purpose of raising it, by means of the chains which pass over the windlasses and pulleys at the end of the derrick, and he is asked, in cross-question 53, if, during the operation of the machine, the derricks were in their hoisting position, and the chains were connected, drawn taut, so as to support this upper section, and the pawls thrown out of gear, whether the joint between the upper and lower sections would then be a telescopic joint, within the meaning of the complainant's patent, and he answers "It would not."

Now, the Court cannot fail to perceive that in the case supposed there would be the same joint as that described in the patent, without any operative addition or diminution whatever; and not only that, but also that it would be operated by the same means, namely, a support from the boat or float.

Again, before the completion of the cross-examination of this witness, the witness Foster had been examined in reference to a drilling apparatus pleaded as a defense in which a platform was supported on three or four legs, as shown in Exhibits Foster, numbers 1, 2, 3, in which examination he had stated that the legs which supported the lower plate were telescopic, they being made so that they could be longer or shorter, and secured by set screws. (See page 111.)

The witness Peck, in his further cross-examination, was referred to this construction, and was asked whether the joint there shown was a telescopic joint, and he says that "when unclamped it undoubtedly is a telescopic joint." How does it happen that he can see a telescopic joint in this Exhibit, introduced as a defence, and could not see one in Exhibit D, when that joint was unclamped, or in other words, released on the pawls?

Many more quotations might be made from the testimony of this witness, showing his utter unreliability as an expert in this case, but probably those already made are considerably more than sufficient for the purpose.

We may perhaps pertinently ask what sort of a case it must be which requires such expert testimony as we have been considering to sustain it?

Having thus considered the testimony of these witnesses, called as experts on the part of the defence, in reference to the value of their testimony generally as experts, let us now examine the objections they make to the manner of carrying out this invention, described and shown in the complainants' patent, which objections may at least be fairly presumed to be the best they could possibly suggest.

The witness Eccleston, states his objections in his direct examination, in his answers to questions 34–41, 44, 45, which, when bereft of their verbiage, seem to be, substantially, that the boat could not be held steady enough for practical operations; that it would be subject to collisions, and that the system of anchorage would tend to turn the dam over. Now, it is not contended, I believe, by any of these experts, that the boat described in the patent and shown in Exhibit E, is any more difficult to hold in a tide-way than the scow shown in Exhibit D. Let us see, then, what the defendant Newton says in his report of September 29, 1871, on the subject of holding this boat in place. Referring to page 726 of the report of the Chief of Engineers, volume second of the report of the Secretary of War for 1871, we find in Gen. Newton's report, above referred to, the following language:

"It has been found perfectly practicable to hold the boat in a position, fixed, or at least imperceptibly varied,

during the prevalence of the strongest currents in the lower part of the East River." Such was the representation of the defendant Newton, made before this suit made it necessary to prove the contrary to be the case.

Which, may we ask, is entitled to the greater consideration, this representation of the defendant Newton, made before it was necessary to show that this boat would move, or this representation of the defendant Eccleston, under the pressure of this suit?

On the part of the complainants, Mr. E. S. Renwick, an old and experienced expert, and Mr. William C. Hicks, also an expert of experience, and who has himself had practical experience in holding boats in a current or tide, as appears from his answer to question 3—both testify that in their opinion the apparatus shown in Exhibit E, and described in the patent, may be held sufficiently still in a tideway for practical operations, and successful drilling; (Renwick's testimony, pages 59 and 60 of the complainants' testimony, questions 6 and 7; Hicks' testimony, pages 88–91, questions 4–7,) and their testimony accords exactly with the experience of the defendant Newton, as stated in his report above referred to. The witnesses Tower and Peck make similar objections, but allow us to ask which is most entitled to belief, the testimony of these known and accomplished experts, Messrs. Renwick and Hicks, of conceded reliability, backed by the statement of the defendant Newton himself, or the testimony of these unknown experts, one of them a party in the cause, and the testimony of all of them so open to adverse criticism as we have shown it to be? Let us examine this statement of the defendant Newton a little more critically, and see what it amounts to.

In his report of September 29, 1871, in the latter part of which we find this statement, he goes on deliberately to describe his experience with the steam drilling screw which is represented in Exhibit D, stating its uses and capabilities, its defects and mishaps, and the facts, or some of them, determined from its use; and among them, so set forth, he states, as settled, ascertained and determined by this experience, and without any qualification or doubt,

that "it has been found pertectly practicable to hold the boat in a position fixed, or at least imperceptibly varied, during the prevalence of the strongest currents, in the lower part of the East River." Here, then, was a fact determined by the principal defendant himself, by actual experiment, and which no longer rested in the domain of uncertain theories or the opinions of experts. We have no disposition to question the truth of this statement, and the defendants have no right to ask us to believe that this defendant stated falsely in regard to this fact in the case, simply because it is now to their advantage to have it believed that the fact is otherwise than as stated in this report.

This fact, demonstrated by the experience of this defendant, utterly destroys the foundation upon which the defendant's experts have built their theory of the want of utility of the complainants' invention, and as completely undermines their conclusions, for the entirely unanswerable reason that those conclusions are based upon the hypothesis which this fact so thoroughly explodes. Here was a fact worth all speculation ascertained by actual experiment, and that, too, by one of the defendants. Could anything be more positive or conclusive than that as to the practical utility of the invention? (See testimony of Renwick, pages 59-60 of the complainants' testimony, question 6; testimony of Hicks, pages 80, 90, question 6.)

The defendants have also endeavored to show, by their experts, or some of them, that the making of the dam in sliding or telescopic sections is not useful or necessary, but the testimony of these witnesses themselves bears on its face its own refutation of any such theory, and the advantage is so obvious, that very little time need be bestowed on this point. And here it is entirely proper that the defendants should elect what position *they* will take in regard to the question whether or not the well-hole of the boat forms a part of the dam; for if it does not, we have a different condition of things by about four or five feet from what we have if it does, and for the reason that the draught of the boat, as appears from the testimony of the defendant Eccleston, cross-question 114, page 41,

varied from four to five feet, and because this scow does really act as an upper section of the dam, and the defendants ought not to claim the benefit of this fact on the one hand, without acknowledging it on the other in their argument; and we propose to show from the defendants' own testimony that it is desirable to have this enclosure or still-water dam extend to the top of the water.

Turning now to the testimony of the defendants' own witnesses, we find that the defendant the witness Eccleston testified, in his answer to cross-question 111, that the height of the dome from the bottom to the top was fourteen feet four inches, and from his answer to cross-question 100, that the cylinder or upper portion of the dam became "stuck" at a projection of about five feet and six inches above the top of the dome. This would give the distance of nineteen feet and ten inches from the bottom of the dome to the top of the cylinder. It appears, also, from the testimony of the same witness, cross-questions 113, 114, that the deck of the scow was from four feet six inches to five feet six inches above water, according to the load, and that its draught varied likewise from four to five feet, which would give the scow from its deck to its bottom a depth of about nine feet and six inches. It also appears from his answer to cross-question 115, that the bridges, when let down into position for working the drills, were about nine inches at the heel and sixteen or seventeen inches at the centre above the deck. This would give between ten and eleven feet from the bottom of the boat to the bridges. It also appeared from his answer to cross-question 87, that the variation caused by the tide in the depth of water on Diamond and Coenties reefs is about six or seven feet. Now, by comparing these figures, we shall see that this apparatus with the cylinder fast in the dome at the height stated, could be worked in a depth of water between fourteen and fifteen feet at low tide, without the cylinder striking the bridges; while on the other hand, the water might be some twenty-four or twenty-five feet deep at high tide without allowing the current to pass under the line of the bottom of the boat and over the top of the cylin-

der. Here then would be a range of not less than ten feet, anywhere within which there would be substantial protection from top to bottom inside of the dam thus formed. Taking out, then, the six or seven feet rise and fall of the tide, and we have a margin of some three or four feet, or from between fourteen and fifteen feet to somewhere from seventeen or eighteen to eighteen or nineteen feet depth of water, at low tide, in which, during all conditions of the tide, this inner space within the dam would be entirely surrounded, from the bottom of the dome to the surface of the water, the drawing out or forcing in of the cylinder in the well-hole of the boat, caused by the rise and fall of the tide, giving the necessary compensation between those points, without it being strictly necessary to change the adjustment of the cylinder and dome forming the two lower sections of the dam with relation to each other. If, however, a greater depth at low tide was reached, this adjustment caused by the rise and fall of the boat, would, at high tide open a line between the line of the bottom of the boat or well-hole and the top of the cylinder, through which the current or tide would pass between them, and the protection, though useful as far as it went above and below this opening, would be broken at this point, and would not, therefore, be perfect. It would, therefore, be desirable in that case to have the cylinder set at a higher position in the dome, so as to close this gap. On the other hand, if the depth of water was less than somewhere between fourteen and fifteen feet, it would be necessary to reduce the height of the cylinder above the dome, or it would strike the bridges. Hence it will naturally follow that a variation of three or four feet in the depth of water would not imperatively require a change in the adjustment of the cylinder in the dome, but beyond that point it would be necessary, in order to give perfect protection from all states of the tide.

Now, in view of these figures, let us see what this witness says about a longer extension of the cylinder above the dome on Pot Rock, where, as he states in his answers to cross-questions 81–85, pages 36, 37, the water was from 21–23 or 24 feet at low tide. It appears, from his

direct testimony, questions 15–17, that the steamer Cathcart collided with the scow and destroyed the cylinder which was originally put in, and that they then put in a much longer cylinder, which, as appears from his answer to cross-question 167, page 49, was six feet longer than the previous one; and he says, in regard to this new cylinder, in his answer to question 19 of his direct testimony, page 24, "It being higher, enabled us to send down the diver while the tide was yet running, and the principal use was for sending down the stone tub for hoisting the stone out of the dome. It was a conductor for it. It was further useful on account of the changes of the current, there being a counter-current or a current running one way at the bottom, and another way at the top, and quite frequently it happened that in waiting for slack water on top, we found a strong current at the bottom, rendering it impossible for the diver to do any work."

Now, could anything possibly show the advantages of this adjustible dam, more clearly or conclusively, than this same testimony of this witness for the defence? We have already seen, from his own figures, that the dam could not possibly be worked in less than fourteen or fifteen feet of water (which was the depth on Diamond and Coenties reefs when they went to work on them) at the adjustment at which the cylinder, as he says, became fixed; for it is evident, aside from every other consideration, that as the bridges which carry the drilling engines could not be let down into place, the drills could not be worked by them until this was done. But here, on Pot Rock, where the water was from 21 to 24 feet deep at low tide, it appears definitely, from the testimony of this witness, and he too a defendant in the case, that it was necessary that the cylinder should extend higher above the dome, in order to enable the diver to work at all. Even the testimony of the defence then conclusively shows *that it is* important that the height of the dam should be adjustable. But this is not all. This testimony of this witness shows that it was necessary that there should be a dam or enclosure at the point of operations, and that this enclosure, in the defendants' machine, did

act as a dam to break the force of the current; and it shows very clearly that the testimony we hereinbefore alluded to on the part of the defence, that this device of the defendants was not a dam, but merely a stable frame to support the drills, was simply so much nonsense, adapted to no better purpose than an attempt to deceive the Court.

Again, this witness testifies, in his answer to questions 153–166, that this wooden cylinder, while on Pot Rock, sometimes came up flush with the deck of the scow, and was sometimes entirely submerged—perhaps three or four feet under water, and in either position answered equally well; that it never went under water so far as to destroy its usefulness. Now, this shows clearly that the well-hole, or, if the Court please, the boat, serves as a part of the dam, otherwise there would have been a clear current of three or four feet over the top of the cylinder, and that, too, the most rapid portion of the tide. That this adjustability of the height of the dam is advantageous is also apparent from the fact that in 1871, more than a year after the machine was built, the defendants were unquestionably adjusting it, as appears from the testimony of the witnesses Conklin, Rodman and Quinn, found respectively on pages 39, 40, of complainants' testimony, questions 3, 12, 16; pages 3–9, questions 12, 58; pages 135, 136, question 6, and alteration of statement in regard to date, page 139 of defendants' testimony. The same is also shown by the report of the defendant Newton, of September 29, 1871, and published in Part 2 of the Report of the Secretary of War for that year, in which, on page 726, in speaking of the damages to this apparatus, sustained by collisions, he states that the *telescope of the dome was crushed in, so as to be incapable of being worked.* Now, this statement shows conclusively *that he* at that time regarded the working of this telescope as important, else why should he state it as one of the damages caused by collision? It is not only apparent, then, on the face of well-known facts, that this adjustability of the height of the dome is useful and important, but it is also shown by the defendants themselves. And it is also not only apparent, but in like

manner shown, that the well-hole, or, if the Court please, the boat, forms practically a part of the dam in Exhibit D.

But will the defendants say that the well hole or boat does not form a part of the dam because it is not fitted closely to it, and that the current will rise up through the space between them and the flow over the top of the cylinder. If so, that objection is effectually disposed of by the testimony of their witness Eccleston, in his answer to cross-questions 163–166, before referred to, pages 48, 49, in which he says he would as soon have the top of the cylinder three or four feet under the water, as to have it flush with the deck, for all practical purposes—the important purpose being, as we have seen from his answer on page 24, to question 19, the protection of operations from the current.

The next defence alleged in the answer of the defendant Newton, is a general denial of infringement. The other defendants also deny infringement in different forms.

Now, Exhibit D is admitted by both parties to be a correct model of the machine which constitutes the alleged infringement, as may be seen by stipulation found on pages 21 and 22, of the complainants' testimony, and, as appears by said stipulation, is a model produced by the defendants themselves, for the purpose of being used as evidence.

The first point in this defence, of want of infringement, which, from its nature seems to claim our attention, is that set up in the answer of the witness Peck, to direct question 5, page 91, of the defendants' testimony, and the answer of defendant Quinn to question 16, page 137, which, when stripped of its verbiage, seems to be that the enclosure shown in Exhibit D is not a dam, does not act as such, or operate to check the flow of the current. Peck testifies "Exhibit D is not a dam, * * * * neither is Exhibit D constructed and arranged for the purposes described in the Letters Patent, which the patentee states to be to produce still water in which to operate for blasting and removing obstructions. The machine represented in Exhibit D is intended for no such

purpose, but is simply intended as a stable frame or support for holding the drill tubes used in drilling the rock below."

The defendant Quinn goes a little further still, and says, in speaking of the dome in Exhibit D, in his answer to question 137:

"Running the tide, the tide runs strongest in there than it does outside."

Now, as intelligent men, we must know, from the very nature of things, and without evidence from any witnesses to prove the contrary, that this testimony is, to say the least of it, untrue; and simply shows the desperation of the defense, and a want of respect for the intelligence of the Court; for it is clearly absurd to say that this enclosure, instead of checking the force of the current, actually accelerates it, so as to give an actually more rapid current inside of this enclosure than outside of it, and it is scarcely less so to say that this enclosure does not check the current at all.

Even the defendant Eccleston, who, as we have seen, could, under pressure, falsify his own testimony, could not go so far as this, but admits, when pushed to it on a repeated question (cross-question 213, page 57, defendants' testimony), that he has no doubt the dome does break the force of the water.

Let us see what the defendant Newton says on this subject, previous to the commencement of this suit, and even now. His caveat of July, 1869, which has been put in evidence on the part of the defense, shows a dome-shaped enclosure, substantially identical with that shown in Exhibit D. In his petition he declares it to be "for the purpose of conducting operations in waters with rapid currents." In his oath to the caveat, he speaks of it "for conducting operations in swift waters;" and in his description forming a part of this caveat, he says: "This machine can be used to create still water within the space enclosed, in which divers may with facility work." And in his answers to cross-questions 43 and 44, page 154 of defendants' testimony, he testifies that he then believed, and now believes, the statements contained in said caveat to be correct. If, then, this testimony of the defendant

Newton is true and correct, it is entirely clear that the contrary testimony of his witness Peck, and the defendant Quinn, must be untrue and incorrect; and that it is so, is also fully evident, not only from the nature of things, but also from the testimony of the witness Renwick, question 3, page 23, cross-question 13, page 29; and the testimony of the witness Hicks, question 8, pages 91, 92, which coincides with the testimony of the defendant Newton, above referred to on this point.

The next point in order in this part of the defense is that made by the witness Peck, in his answer to question 5, which seems to be that the enclosure for the drills in Exhibit D is not an adjustable dam, constructed and arranged in sliding or telescopic sections, as claimed in the first claim of the patent. And in support of this theory he takes the ground that the word "adjustable," as used by the patentee, should be limited in its construction to a capability of lengthening and shortening in a vertical direction with the rise and fall of the tide. That this view is erroneous is evident in the first place from the language of the patent itself, in which the varying depth of the water is spoken of as a matter to adapt the dam to, as well as the rise and fall of the tide, as we may see by consulting the introductory part of the specification; and the specification nowhere makes a condition of the invention that the lengthening and shortening of the dam shall be accomplished by the rise and fall of the tide. On the contrary, other means are described for lengthening and shortening the height of the dam, namely, taking up and letting down the lower portion of it by chains, and for another purpose besides that of simply accommodating the rise and fall of the tide—namely, to make its removal from place to place more convenient. The claim is not for the rise and fall of the tide as a means of lengthening and shortening this height of the dam, but for the dam itself made capable of being lengthened and shortened to adjust it to different heights, by constructing and arranging it in sliding or telescopic sections.

Another consideration, which shows conclusively that this limitation of the claim cannot be correct, is the fact

that the first claim relates to the dam *only*, and does not include in its provisions any boat, support float, or any other device whatever, capable of extending or diminishing the height of the dam by means of the rise and fall of the tide. It might be extended or shortened, and it might be secured in an extended or shortened position by any of the numerous devices known to mechanics, and adapted to that end, and for the purpose of adapting it to the state of the tide or to any other contingency involved in its use, and all the parts mentioned in the claim would be there, and all its conditions fulfilled, notwithstanding there might be no boat or float connected with it. It might be used in a stream where there was no tide to lengthen and shorten its rise and fall ; and it might be lengthened and shortened by other means to adapt it to the depth of the water, which is one of the purposes mentioned in the patent. It might be shortened for the convenience of transportation, and extended to form an enclosure of the proper height when on the spot where it is to operate, which are other purposes indicated in the patent. Neither this claim, by its terms, nor the specification, anywhere limits this claim to the lengthening and shortening of the dam by the action of the tide, nor to adapt it solely to the ebb and flow of the tide, and such limitation is not to be inferred, especially in view of the facts that the specification indicates other purposes, and describes other means for lengthening and shortening the height of the dam.

If, however, it were otherwise, the well-hole or boat, forming, as we have already seen, a part of the dam, fulfills all these conditions.

The next point which claims our attention in this part of the defense is that set forth by the witness Peck, in his answer to this same question 5, page 91, defendants' testimony, that the joint between the dome or lower section of the dam and the next section or cylinder, in Exhibit D, is not a telescopic joint; and before proceeding to a full consideration of the testimony of this witness on this point, let us see what other men, defendants and their employees—who had, to say the least, quite as thorough a knowledge of practical mechanics as this witness—thought about this matter.

The first of these witnesses is James H. Stevens, who was employed in the construction of the machine represented by Exhibit D, and was foreman of the boiler factory at the Novelty Iron Works at the time, as appears from his testimony, on page 2 of the complainants' testimony. In answer to question 7, page 3, asking him to state what parts of the apparatus he made, he says: "I superintended it—the telescope," etc. And in answer to question 9, same page, he says: "The telescope worked up and down, the same as in the model, and it had catches on, the same as this has got, and pawls to adjust it." Now, certainly, this apparatus was not designed to obtain a view of distant objects, like a telescope, and the only possible thing in this apparatus to liken it to a telescope, was the nature of the joint formed between the sections of the dam. And he calls this cylinder "the telescope," which shows clearly enough that he regarded this joint as telescopic in its character. Again, in his answer to question 13, page 4, he says: "I saw the telescope hoisted and lowered," etc. And he again speaks of it as the telescope, in his answer to cross-question 58, page 9.

Richard S. Stevens, another man engaged in the construction of this machine represented by Exhibit D, and who was at the time engaged at the Novelty Iron Works, as a fitter up of boilers, as appears from his testimony, page 37, in his answer to question 5, page 11, says: "I worked on the telescope," referring to the cylinder in Exhibit D; and he speaks several times, in this answer of the cylinder, calling it the telescope. In his answer to question 6, page 12, he says: "I saw the telescope work up and down."

Lyman G. Hall, an engineer employed in the construction of the machine represented by Exhibit D, and at the time superintendent of the erecting and machinery department at the Novelty Iron Works, as appears from his testimony on page 16 of the complainants' testimony, says, in his answer to question 3, same page: "The apparatus that was built there—the dome part and the part they call the telescope—was built in the boiler shop."

Thomas N. Conklin, a diver, as appears from his testimony, was employed to work upon this machine, repre-

sented by Exhibit D, on page 40 of complainants' testimony. Question 13: "State whether or not there was any part which slid in and out of the opening at the top of the dome?" Answer: "There was a top that was called the telescope;"—and he goes on in his answer to questions 14 and 15, to speak of its being slid up and down; and he speaks of it again as "the telescope" in his answer to question 16; also in his answer to re-direct question 36, page 42. Now it is entirely clear, as above suggested, that there was no possible reason why these witnesses should call this cylinder "a telescope," except from its relation to, or connection with, another part of the dam, and yet they call it "the telescope;" and it would seem from their testimony that that appellation was generally applied to it by those connected with the enterprise. Most of these witnesses speak of it as a telescope, when speaking of its connection with the dome, and this shows clearly that they regarded this joint as telescopic. But this is not all. Even the defendant Newton himself, in his report of September 29, 1871, calls it "the telescope," and says, on page 726 of the report of the Chief of Engineers for that year, "and the telescope of the dome crushed in so as to be incapable of being worked." It is true that the defendant Newton says in his testimony, cross-question 55, page 156 defendants' testimony, that if he used the term telescope in this report, it was in a loose sense, and the term was inaccurate; but perhaps the discovery of the inaccuracy of this term may be regarded as one of the many discoveries made by the defendants since this suit commenced. It does not appear that any such inaccuracy in the matter was discovered before. It must be apparent, then, that all these mechanics—defendant Newton among the rest—must have been entirely mistaken in the character of this joint, or else this expert is wide of the mark on this point.

His first objection, that this joint between the dome and cylinder in Exhibit D, seems to be that the joint has added to it an appliance by which it may be fixed in any desired position, for the time being; and in this view, and with this understanding, he is asked, on his

cross-examination, cross-question 32, page 100, defendants' testimony, whether, if the racks and pawls were eliminated in Exhibit D, the joint would then be telescopic, and he says "I think it would."

Now the witness had stated at the outset, in his answer to question 5, that "a telescopic joint is one that moves freely, both in and out." And he gives as his reason why the joint in Exhibit D was not telescopic, that it had the racks and pawls attached to it, which would prevent its sliding in except when the pawls were thrown out of gear. Now the joint proposed by this cross-question 32, exactly met the conditions this witness had laid down, with some flourish, in his answer to question 5, and reiterated in his answers to cross-questions 20-26, pages 98 and 99, and his answer to cross-question 32 was in exact accordance with the theory he had thus laid down, and was the only conclusion which he could arrive at consistently with that theory. It had, however, the disadvantage that it showed very clearly that the defendants had simply taken Mr. Lewis' telescopic joint and added to it a device for keeping it in any desired adjustment or position; and furthermore, that when the racks and pawls were thrown out of gear, to adjust the height of this cylinder in the dome, it was a complete telescopic joint, according to the definition he had given, without practically any addition whatever; and as a sequence, that the defendants, when they adjusted this cylinder in the dome, were actually using the telescopic joint, pure and simple. But immediately after this answer was given, an adjournment was had from the 11th to the 13th of March, which evidently gave the witness time for reflection on his answer and its consequences, and he seems during that interval to have come to the conclusion that though he had got exactly such a telescopic joint as he had bargained for, it was not what he wanted, for, on re-assembling, he perfectly demolishes this answer by adding to it the words "technically but not practically," and in answer to the next question, "Why not practically?" he answers, on page 101, "Because if the pawls were removed the upper section would fall down to its lowest position; and

inasmuch as there are no provisions made for raising it up while the machine is in operation, it would *not* be any joint at all for practical purposes." In other words, his testimony amounts to this—that this joint between the cylinder and the dome in Exhibit D is not a telescopic joint because it is provided with a device to hold it in position, and when this device has been taken away, it is not a telescopic joint, practically, because it has no device to hold it in position. That is substantially what it comes to. It can scarcely be necessary to pursue this absurd and contradictory line of testimony further. The fact is apparent that the joint is identical in both cases. In both cases the dam is made in sliding or telescopic sections, and the only difference, so far as the operation of the joint between these sections is concerned, is not in the joint itself, but in the means employed to hold it in adjustment. So far as the upper section of the dam, which in one case is attached to the deck of the boat, and in the other case made a part of the boat itself, is concerned, the mode of support is precisely the same in both cases.

Another point in this part of the defense is that set up by the defendant Newton, in his answers to questions 12 and 13, page 145, which are to the effect that during the period covered by the operations of the machine represented by Exhibit D, no use has been made of the provisions made for changing the adjustment of the cylinder in the dome, and no advantage has been derived from such use. That the first fact is simply untrue is evident not only from the report of the defendant Newton, already referred to, page 726 of the report of the Chief of Engineers for 1871, in which he states that the telescope of the dome was crushed in by collision, so that it could not be worked, thus indicating that it was customary to work it; but also from the fact that three witnesses (two of them witnesses for the defense, and one of them a defendant himself), testify positively to adjustments of the cylinder or telescope in the dome, in the year 1871. (Conklin's testimony, questions 13–16, page 40; complainants' testimony, cross-question 25, page 41; Rodman's testimony, question 12, page 3; defendants' testimony, cross-questions 58–60, page 9; Quinn's

testimony, question 6, pages 135, 136, and correction on page 139.) So far as any advantage derived from this use is concerned, it is entirely fair to presume that the answer of the defendant Newton on this point was based upon the preceding one that it had not been used, but if it were otherwise, its use implies that it was advantageous to use it, and it hardly lies in the mouth of the defendants, after using it, to say that its use was of no value, and especially when we find them using it, a year or eighteen months after the machine was put in operation, and after they had had ample time to ascertain whether its use was or was not of value. (*Hays* v. *Sulson*, 1 *Fisher's Patent Cases*, 535; *Many* v. *Jagger*, 1 *Fisher's Patent Reports*, 232.)

Nor is it material or essential to this case that this adjustment was not made very often. A man might just as well say, when sued for infringing an adjustable tension in a sewing-machine, that he was not liable, and had not used the adjustment to any substantial extent, because he said he had only adjusted it once in six months, when he merely changed the character of his manufactory from summer to winter goods; that might very well be as often as he would need to change the adjustment, and yet this capability of adjustment might be just as necessary to him as if his work changed every day, and might be absolutely essential to the success of his operations.

Take, for another example, an improved regulator for a watch, which is designed to regulate a watch more closely than the ordinary regulator. When once brought down to close time it might not be necessary to change it again for a year, perhaps not for ten years. But suppose the one we have on the watch in our pocket had been obtained in fraud of the rights of the inventor, would it be sufficient for us to say, because we had got it down to the proper adjustment, that really we only adjusted it for a week or two, during which time we derived no benefit from it, and that now we have ceased to adjust it, and consequently must be regarded as having ceased to use it, and that, therefore, we are not liable? Would not the Court, very naturally and properly, say that we were really using the adjustment now, and deriving its benefits,

and might very well be so doing for the next ten years, though we might not in that whole time adjust it again?

In both cases the practical fact would be, that the parties would have used the adjustment during the whole time, for it might be quite as essential to make such adjustment for the six months work as it would for the work of a single day, and the use of the adjustment would be a continued use, till a change was rendered necessary by a change in the work or the circumstances of the case. And, besides, the defendants had the additional adjustment constantly changing from day to day, and from hour to hour, caused by the rise and fall of the tide of the upper section, which, in the patent is attached to the deck of the boat, and in Exhibit D is built in the boat.

The testimony from the defendants themselves in regard to this dome and telescope, without reference to any other evidence, has been most extraordinary, and has presented them in such diverse and antagonistic hues as might make any respectable chameleon who had the slightest regard for the reputation of his race, hide his head for very shame.

First, we have this caveat of the defendant Newton, filed July 19th, 1869, representing a dome of this form, and stating that it "can be used to create still water within the space enclosed, in which divers may, with facility, work." And this representation this defendant even now in his testimony, cross-questions 43 and 44, page 154, says he then believed and now believes to be true. Then we have his report of June 9th of that year, with an engraving showing the form of this dome. Not a word in either that forming a stable frame for the drills, as testified by the witness Peck, was any part of its purpose; on the contrary, in the report last referred to, on page 393 of the report of the Chief of Engineers for that year, he says: "The drilling machines are separate from the caisson, and may be changed at will."

We find also a similar representation in regard to it, in his report September 30, 1870, which, unfortunately, does not appear to be in evidence, but may be found, if desired, on page 434 of the report of the Chief of Engineers for that year. Not a word there, either, about

the dome being designed as a stable frame, for the drills. Then in the defendant Newton's report of September 29 1871, page 726 of the report of the Chief of Engineers, the telescope comes into view, and among the grevious damages there reported he says, "and the telescope of the dome crushed in, so as to be incapable of being worked," thus showing not only that this joint of the dome was then regarded as telescopic, but also that its being crushed in so that it could not be worked was a calamity; but then it must be remembered that everything was lovely and this suit was not at that time commenced or in prospect. Then we have the testimony of the witnesses, the two Stevens and Hall, on the part of the complainants, showing the care taken in fitting this telescope so that it should work properly up and down in the dome, and of the witness Conklin in regard to its being worked. They all call it "the telescope"—in fact, everybody seems to have called it the telescope then, and to have known all about its intended operation. The defendants' witnesses, Quinn and Rodman, also testify to its being worked in 1871. But in 1872 this suit was brought, and now how changed every thing appears. The dome, according to some of the defendant's witnesses, instead of being designed to produce still water inside of it, to protect operations from the current, as stated by Newton in 1869, is designed for an entirely different purpose, not then mentioned, if even thought of, by Newton, and not for that purpose at all, and does not accomplish it. This cylinder, apparently called the telescope by everybody, from 1869 to 1871, and with which so much pains was taken at the Novelty Works to so fit it that it would work properly up and down in the dome, and which Newton, in his report of 1871, so much regretted being crushed in so that it could not be worked, is no telescope at all; no use has been made of its capability of adjustment during the period covered by the operations of the machine; and even the superintendent of the machine, with all his mechanical knowledge, cannot tell what these racks and pawls were for, or see any practical use for them. Are not those representations consistent, as well as interesting?

But stay a moment—the climax is not yet reached. The defendants Newton and Eccleston testify that in 1872, before this suit was commenced, said Newton gave an order to have the cylinder bolted fast to the dome. What for? If the representations of the defendants and their witnesses are true, did not Newton, and everybody that had anything to do with the machine, know that it was then already as fixed in its position as the laws of the Medes and Persians? Had the pawls failed to hold it up? On the contrary, the defendant Quinn testifies, page 136, questions 8 and 9, that they held so firmly that they could not be disengaged, or the cylinder lowered. Had it shown any disposition to rise up out of its place? If so, those braces which Rodman swears in page 4, defendants' testimony, that he put in, the Summer of 1871, ought to have inexorably held it down and curbed its rising and turbulent spirit, if there was any virtue in iron. What possible reason could there be, then, for bolting this upper section fast to the dome? Did the defendant Newton snuff the battle from afar, and conclude that, if a contest came, it would be very convenient to be able to say that he had given orders to bolt this cylinder fast? Did he know that even then persons were investigating this infringement, who, unless they suddenly and mysteriously disappeared, would never rest till they had ascertained the facts in regard to it? And did he suppose that, by putting in a couple of sixpenny bolts, which could be taken out again in five minutes after the storm blew over, he could evade responsibility for infringement in this case.

We next come to the denial of infringement as regards the second claim.

Looking at the self-anchors I, described in the patent and represented in the model, Exhibit E, and at those shown in Exhibit D, it is easy to see that they are constructed substantially alike in every particular—that they are alike hung to slide in sockets attached to the lower section of the dam. So far, it cannot be claimed they are substantially unlike in any respect, or that there is any possible difference in the character of the service they perform, or their mode of performing it. The only

thing which is or possibly can be said to at all modify their action is the addition to this combination, in Exhibit D, of the cams designed to be used after the dam has been set in position, and these self-anchors have descended to their place upon the rock, to fasten these self-anchors in a fixed position, so that they could not slide upwards in their sockets and get away from their work. Admitting this to be an improvement, it is only and simply an addition to the patented combination. In both cases these self-anchors adjust themselves by their weight to the inequalities of the rock, and take hold of it in the same manner; the only difference being that, when they have done so, and have complied with all the conditions of the patent, there is, in the case of Exhibit D, an additional provision, by which they are held there, by something in addition to their own weight, or, in other words, the weight of another part is added to their own. The cams do not, and are not, designed to prevent or at all interfere with these self-anchors adjusting themselves upon the rock and taking hold of it exactly as they do in the patent, and it is entirely clear that, after this is done, the fastening of these self-anchors to the dam, in such a way that they cannot get away from their work when any strain is thrown upon them, cannot by any possibility deprive them of their character as self-anchors, or at all reduce their efficiency as such, but, on the other hand, may increase it, for it gives them the advantage of the weight of a portion of the dam, in addition to their own weight, to hold them to their work.

It is represented in the testimony of the defendant Eccleston, question 24, page 25 of defendants' testimony, that these devices were used for the purpose of leveling the lower portion of the dome; but assuming this to be so, it is simply adding this to the original function for which they were designed and adapted in the patent, without at all taking away or impairing their character as self-anchors. The original invention remained there still, whatever might have been added to it, and this is so obvious, that extended discussions on this point can hardly be necessary. The objection that the defendants have not used this part of the invention, because they

have added something to it, is then clearly not well taken.

In regard to the third claim of the patent, the witness Peck says, in answer to question 7, "The plaintiff claims in that third specification a combination of boats, supports or floats with the dam." And further on in his answer he says, "The plaintiff also claims in that specification a peculiar arrangement of anchors to hold the boat in position for the purposes described." This evidently amounts to saying that this claim amounts to two claims—first, the combination referred to, and second, the arrangement referred to. This construction might be very well for the complainants, for it gives them an additional claim, and the infringement would be just as easily established in regard to both claims as if the claim was regarded as a unit. The only objection we have to the construction is, that we cannot conscientiously say to the Court that we believe this to be the true construction—we wish we could.

Taking this construction, however, for the purpose of reviewing the testimony of this witness in regard to it, his first objection is that in Exhibit D there is no connection whatever between the boat or float and the machine which he has styled the frame for supporting the drill when in actual use. Let us see whether there is or not. In Exhibit D, they clearly have a connection in the apparatus for working the drills, and such connection is essential to the operation of the drills within the dam shown in Exhibit D. It might as well be said that if, in the form of construction of this machine shown in the patent, it occurred at any time that the machine was so balanced that the sections of the dam did not bear on each other, there was no connection, as to say it in this case. Again, the actual operation of the machine upon the rock is not the only object considered. Portability is one of the objects; and when this object is to be consulted, or, in other words, when the dam is taken up and removed from place to place, there is, undoubtedly, a connection between the boat and the dam, even the lower sections of it, in both cases.

Furthermore, we have undertaken to state in another

part of this argument that the combination does not necessarily mean direct connection, and that direct connection is not necessarily combination, but that the word "combination," as used in patents, means such a relation of parts that one co-operates with the other in the production of a result. Now, in this view of the case, and in fact, in any practical view of the case, what possible difference can it make whether the boat and the dam actually touch each other or not, so long as they accomplish the purposes of the combination, and in substantially the same way? Suppose one of the sections of the dam, constructed as described in the patent, should happen to fit loosely, and under some circumstances, or if the Court please, under all circumstances, they did not touch each other, would that make any difference in the combination? They produce the same result in substantially the same way whether they are in actual contact with each other or not, and the fact of actual contact or the want of it does not make any difference with the operation or the real substance of the invention. But, as we have already shown, the upper part of the dam in Exhibit D is not only in actual direct connection with the boat, but is really a part of it; and it then comes to this, that the want of contact is not between the boat and the dam, but is really between two sections of the dam itself. It is the same for all practical purposes, so far as this case is concerned, as if Mr. Lewis had made the upper section of his dam somewhat larger than the section next below, so that the two would not actually touch each other. In either case they sustain such a relation to each other as to co-operate for a common purpose, and do so co-operate, whether they are in actual contact or not, even if there were no connection by means of the drilling apparatus, and they as much combine to produce the result in the one case as in the other.

The representation of the witness, that there is no infringement upon what he seems to regard as the second part of the claim, seems to be based on his construction of that part of the claim. He says: "The peculiarity in the anchoring arrangement in Exhibit E is in the connection between the anchor and the deck of the boat,

by a chain or cable passing through a ring attached to the lower section of the dam." Now, if the witness supposed this to be the invention claimed in the third claim of the patent, he had clearly read it to very little purpose, for the claim clearly and in express terms limits it to the "arrangement of anchors to hold such boats in position;" and these chains are just as clearly not adapted to hold such boats in position, but are only designed to hold *the lower part of the dam in position*, and have, therefore, no relation whatever to this third claim, any more than if they did not exist.

In regard to the fourth claim, this witness Peck, in his answer to question 8, page 93, finds no infringement, and his reason, when stripped of its verbiage, seems to be that in Exhibit D the hoisting chains are unhooked when they are not in use, while in the patent they are not unhooked at all. If unhooking a chain, when its use does not happen to be required, constitutes an evasion of a patent, it would seem that patents were very easily evaded. What possible difference can it make whether the chains were unhooked or simply left to hang slack? The excuse is too absurd to furnish ground for an argument.

The defense which properly comes next in the order of argument is that set up by the defendant Newton, in his amended answer relating to the novelty of the invention. It is not set up in the other answers. The first defense offered in regard to novelty is the sort of three or four-legged stool, shown in Exhibits Foster, Nos. 1, 2 and 3, said stool having a double top, and a drill stuck through these two tops, and worked by a crank in a vessel in the offing.

There is not the most remote vestige of a dam or enclosure in the whole structure, and as the dam is the gist of the invention in the first claim, and one of the elements of the combination in all the others, this reference is of course no answer to the patent. A man might as well say, because he had found an old drill somewhere, that he had found an answer to the complainants' invention. It is not even a sufficiently decent approach to the complainants' invention, to furnish ground for an argument.

We will simply refer on this point to the testimony of the witness Renwick, question 3, pages 54 and 55; testimony of the witness Hicks, question 17, pages 88, 99.

The next defence offered in regard to novelty is document No. 90, 35th Congress, the real substance of the matter being the letter of the defendant Newton, of January 21, 1867, to which we have already referred in the report of the Secretary of War for 1868.

There are several circumstances which indicate with unmistakable significance the utter want of value of this defense, aside from a consideration of the structures it suggests or attempts to describe.

In the first place, it does not appear that in any of the many conferences which took place between Lewis and Newton, in regard to the invention now in controversy, Newton ever suggested or intimated that he had himself invented the invention patented by Mr. Lewis, or any portion of it, or that it was not new, which he would very naturally have done if he supposed such to have been the case.

In the second place, in his published reports, he represents that this machine, Exhibit D, was invented by him only in May, 1869—more than two years after the date of this letter of 1867—as we may see from his letter on page 439 of the report of the Chief of Engineers for 1870, and in none of his reports or letters in evidence does he make any mention of those structures suggested in his letter of January 21, 1867, as being the invention shown in Exhibit D, or forming any part of it, or even being at all connected with it.

Another circumstance which may, perhaps, give some indication of the value of this defense is the fact that, though this suit was commenced in July, 1872, this defense was not introduced into the answer till March, 1873. Of course, he knew the facts set up in this defense before, for he was the author of the matter here pleaded, but it took him about seven or eight months to bring his imagination to a sufficient state of cultivation to enable him to suppose that this was any defense. This certainly does not look as if this defense was very apt or pertinent. If it had

been, it would have been the most natural thing in the world for him to have said at once, "that is my invention of 1867," and to have incorporated it in his original answer. He did, however, no such thing; and it was only when his experts, one after another, were breaking down under the test of cross-examination, and the defense was in its last expiring agonies of dissolution, rendering something desperate necessary, that he introduced this defense.

Let us, however, examine this late defense and see what it amounts to. It suggests, but can hardly be said to describe, two devices—one a device for drilling, consisting of a platform supported by vertical supports extending to and resting on the rock, and fastened to the platform, so as to support it in a position above the water, and with drill tubes reaching from the platform to the rocks. There was no dam, either telescopic or otherwise, for protecting the divers or the removal of the rock, and the only mention of any boats or floats in regard to this device, was to the effect that the apparatus might be transported to the place of operations in two scows or floats at the height of the tide, which were to be immediately removed as soon as the tide fell.

There was no still-water dam enclosing the space within which operators might work, or made in sliding or telescopic sections, as stated in the first claim of the patent;—no combination with such still-water dam, either telescopic or otherwise, of the self-anchors described in the complainants' patent, as claimed in the second claim; no such or any combination of boats, supports or floats, with the dam and arrangement of anchors to hold such boats in position, as claimed in the third claim; and no such, or any combination and arrangement of windlasses, chains and boats with the dam, as claimed in the fourth claim of the said patent. Being totally deficient, then, in all these particulars, it certainly can form no answer to the patent if it was otherwise.

Its utter impracticability would also be a fatal objection to it as a reference, if any other was needed. To reach the depth of twenty-six feet at low tide would require these vertical supports to be not less than thirty-two or

thirty-three feet long between the platform and the rock, in order to keep the platform above the water at high tide, and of course these vertical supports would and must necessarily spring and sway very considerably with the current, and there being no support provided for the drill tubes near the rock, and they being necessarily raised above the rock to give clearance for the drills, these must of course be swayed out of place by this swaying of the vertical supports, and in addition to that, the drill-tubes themselves would spring with the current so that they would necessarily vibrate like a reed in the wind or a sawyer on the Mississippi River, and of course no drills could be successfully operated under such circumstances.

The other of these devices is a very different one, and designed for a different purpose. It is represented as designed to facilitate the removal of the rock, or debris, after the drilling-machine has performed its work and the rock has been blasted, and consists, according to the suggestion, of two cylindrical floats made of boiler-iron placed say thirty feet apart from center to center, and inclined towards each other towards their extremities till they meet so as to form one float, say 160 feet long and 40 feet wide, and to these floats curtains of iron, say one foot wide and twenty feet long are attached and hinged to each other, so that they may be folded up as occasion may require. No provision is suggested for giving these curtains any lateral support whatever below the cylindrical floats, nor is any mode whatever suggested to prevent their swaying, below these floats, with the tide. It is obvious, therefore, that towards the bottom they would be the sport of the tide, and would flutter about in it like a window-shade before an open window in a gale of wind. They could hardly be said to in any sense form an enclosure or dam, and instead of furnishing any protection to the workmen, would be considerably more apt to break their legs or heads if they ventured among them. Certainly this device is not made in sliding or telescopic sections, as set forth in the first claim of the patent; it has no self-anchors to hold it in position at the bottom, as specified in the second claim. The arrange-

ment of anchors to hold the cylinders in position is not described, and it has no combination of windlasses, chains and boats to operate a series of drills within it, as set forth in the fourth claim of the patent. Taken altogether, it was a very crude and undigested idea—a very imperfect suggestion of a perfect rattletrap, which it is not pretended that any man ever undertook to construct, and which it is safe to say that no man in his senses ever would build for any such purpose.

That both these devices mentioned in this reference entirely fail to constitute the invention set forth in the complainants' patent, or any part of it, see testimony of the witness Renwick, question 1, page 532, question 5, pages 55, 57, cross-questions 52, 53, 55, pages 75, 76; testimony of the witness Hicks, question 18, pages 99, 100, of the complainants' testimony. On the other hand, it is worthy of remark that not one of the defendants' experts, rash as we have shown them to be, has had the nerve to assert or even to intimate in his testimony that either of these devices, referred to as defenses on the ground of novelty, contains the invention set forth and claimed in the complainants' patent, or any part thereof; and, certainly, when such experts as these cannot testify to the pertinence of a device put in answer by their clients, its absurdity as a defense may be pretty safely regarded as sufficiently established.

The next defense set up by the defendant Newton in his amended answer, but not in the answers of the other defendants, is, that the invention set forth in the complainants' patent was invented by the defendant Newton, who was using reasonable diligence in adapting and perfecting the same, and that the complainant Lewis surreptitiously and unjustly obtained the patent. This point can scarcely require any long occupation of the time of the Court. In the first place, such invention is not proved to have been made by the defendant Newton prior to the patent. If by this defense he means the machine represented by Exhibit D, there is not a single scintilla of evidence showing any invention of it or any approach to it prior to 1869—in the fact he himself re-

presents in his letter of January 3, 1870, to the Chief of Engineers, page 439 of the report of the Chief of Engineers for that year, that it was only in May, 1869, that even the general character of that apparatus was developed. The whole tenor of this portion of his letter indicates that that was the earliest point to which he proposed to date his conception of any such idea, for he says, in evident allusion to his expression in his report of 1867, of hope that the inventive ingenuity of the country would supply the necessary invention for the performance of the work, that "it had been thought probable that the mechanical talent of the country would have been sufficiently interested in this work to have developed a process which should be successful, but of the few projects exhited to me, all, with the exception of Mr. Shelbourne's machine, which I have before mentioned, were upon the face inadequate or impracticable. I was, therefore, compelled to take the responsibility of invention upon myself. Had the idea sooner occurred to me, I should before this have been enabled to make you a report of its capacity for work; but inventive ideas come when and how they will; so it was only in May last that the general character of the apparatus was developed." Now, this language clearly indicates that even the fundamental principles, or in other words, the general character of the machine, Exhibit D was not invented by Newton, certainly before May, 1869, which is nearly a year after the date of the patent. If by this defense he refers to his suggestion of 1867, which we have already considered, that suggestion is not only *not* proved to be the same invention, or any part of it, but is proved not to be, as we have already seen. These devices had substantially nothing in common with the invention described in the patent—they not only fail to show the combination claimed in the patent, but even the elements were wanting.

But is the claim that, because he had in 1867 suggested *some* sort of device in connection with this work, he had the right to lay an embargo on any and every other contrivance for the same purpose? Will it be said by the counsel for the defense that, because Newton's suggestion

of that time was utterly crude and incomplete, he might have invented the apparatus described in the patent, if he had kept on, and that therefore he has a right to claim the invention, because he might possibly have hit upon that invention at last? As well might some man have claimed the invention of the venetian blind, because he said he had suggested some approach to the common window-curtain, so crude and unsatisfactory that no person would ever adopt or use it. There might be a dozen things for the same purpose, and all of them as unlike as these. A man might just as well claim that a patent for a saw was surreptitiously obtained, because he said he had suggested some impracticable and useless axe for cutting the same material. It is not a sufficient defense to a patent, that somebody has suggested *some* device, ridiculous or otherwise, for doing the same or similar work; it must be the *same* device, and must be so far matured as to constitute substantially the same invention. (*Many* v. *Jagger*, 1 *Blatchf.*, 383; *Parkhurst* v. *Kinsman*, 1 *Fisher's Pat. Rep.*, 168; *Parker* v. *Stiles*, 5 *McLean*, 61; *Foote* v. *Silsby*, 2 *Blatchf.*, 274; *Pitts* v. *Hall*, 2 *Blatchf.*, 234—1 *Fisher's Pat. Rep.*, 446; *Winans* v. *N. Y. & Harlem R. R.*, 4 *Fisher's P. C.*, 9; *Johnson* v. *Root*, 1 *Fisher's P. C.*, 366, 367; *Pitts* v. *Edmonds*, 2 *Fisher's P. C.*, 55; *Roberts* v. *Dickey*, 4 *Fisher's P. C.*, 545; *Hays* v. *Sulson*, 1 *Fisher's P. C.*, 536; *Reed* v. *Cutter*, 1 *Story*, 599; *Dixon v. Meyer*, 4 *Wash.*, 71, 72; *Washburn* v. *Gould*, 3 *Story*, 133.)

In the second place, if this suggestion of 1867 is what is referred to in this defense, it is open to the fatal objection that no diligence whatever is shown in regard to it. It was a mere chimera simply suggested by him at that time, and there is not a line or even a word of testimony to show that anything further was done about it, either prior to Mr. Lewis' invention or afterwards. Nor is it possible to connect this chimera of 1867 with the invention patented by Mr. Lewis, or shown in Exhibit D, for it has practically nothing in common with them. It possesses neither the elements nor the combinations. And that the one had no relation to the other is also evident from Newton's own answer in this case,

in which he stated that the device, Exhibit D, was invented by him in 1869 — nothing whatever said about his inventing it, or any portion of it, at an earlier date. And the same thing is shown clearly enough in the quotation just above, from his letter January 3, 1870. Here, first in order, is the allusion to the hope expressed in his letter January 21, 1867. Then comes the waiting to see if this hope would be realized. Then the taking of the responsibility of invention on himself. Then the waiting for inventive ideas. And, finally, the development of the general character of the apparatus, which, he says, was only in May, 1869. If, therefore, the general plan of the apparatus was not developed till May, 1869, it certainly could not have been developed in 1867—two years and some months earlier. Certainly then, according to Newton's own showing, these two devices were not the same invention. But if it were otherwise, there would still remain this objection, which would be entirely fatal, namely, that even then no diligence or any action whatever would be shown for over two years, which certainly would not be reasonable diligence. And what possible excuse had Newton for thus robbing a poor man? None whatever that will bear a moment's investigation. It was a time of profound peace—he could not plead the necessities of a war. He had a powerful government at his back, able to purchase and pay for whatever was necessary to carry on his operations, and which had shown a willingness to honor all his reasonable requisitions.

His excuse now is that the invention was constructed under the authority of the Secretary of War, and for the benefit of the United States. If the Constitution did not expressly provide that private property shall not be taken for public use without due compensation, or it could be shown by some authority higher than the Constitution that the Secretary of War had the right to give authority to so take private property for public use, it might then be necessary to inquire what this authority was, and how it was obtained, for it is evident that this authority must be specific on the one hand, and on the other that it must not have been even obtained through any fault of

the defendants, or either of them. No such authority, however, is produced. Why not? Probably because, if produced, it would not help the defence. An examination of the answers of this defendant Newton to cross-questions 20–32, pages 146–152, indicates that all the authority there was came from the Chief of Engineers, instead of the Secretary of War, and there is not a line or a word of proof to show that the Secretary of War was ever consulted about the matter, or knew anything of the project till the machine was constructed and in operation. It also appears from Newton's testimony that this authority (if any) from the Chief of Engineers was only in reference to what is described in Newton's letter of June 9, 1869, and amounted, practically, to simply a general approval of so much as is there described, and instructions to use such machines as he thought best This is the most we can make of it from Newton's evidence, and very probably, if we had the documents (which the defendants have not seen fit to put in evidence), we might find that it came short of that. Under such instructions as those, he might, with the same propriety, have taken your Honor's easy chair (if your Honor gets any leisure to use such an article), and carried it away to furnish his office. No such authority as that could be construed to give him a right to violate the Constitution by taking private property without compensation. But if it had appeared that the permission came from the Secretary of War, and if such permission were really any defense, it could not help the case, for it must be confined strictly to the terms and extent of the permission. It could not be extended beyond it to cover any point not found in the permission. Now, what was this permission, if any such was given, and on what representations was it based? The defendant Newton in his answer to cross-question 20, pages 146, 147, says: "I submitted a general description of the machine, and received the sanction of the Secretary of War to construct it. I presume, of course, that it was in consequence of my recommendation that the authority was given me to construct it. I may add to this that I received a communication to adopt such means for the removal of these

rocks as I thought best; and I constructed the machine of which I had already noted the War Department, and received approval." But what was this general description which he testifies he submitted, and upon which such approval, whatever that approval was, is supposed to be based? Even this defendant himself does not appear to know, for, when referred to his letter of June 9, 1869, as contained in pages 391, 392 and 393 of the report of the Chief of Engineers for 1869, and asked if that is the communication referred to on which such authority was based, he tells us that he does not know whether it is or not, in his answer to cross-question 21, page 149. But if this authority or permission (for this is the word he finally comes to) had been more specific—if it had really gone to the unsupposable and unconstitutional length of consenting that he should take the complainants' property without compensation, it would still be no defense, if it appeared that such permission was obtained by the influence of the defendants, or either of them, or through any misrepresentation, or withholding of facts by them, or either of them. It is not always enough to show authority legal on its face. Cases of attachment and replevin furnish familiar examples, and, if the grounds of attachment or replevin fail, there is a failure of protection. For another example, suppose I were to apply to the Court for an order of arrest against, say John Smith, and should represent that he entered my office and took away my desk, *vi et armis*, and should stop there, omitting to state that he was a Deputy-Sheriff, armed with an execution against my goods and chattels, would such an order so obtained protect me against an action for false imprisonment? Now, it is clear from the whole testimony, and especially from Newton's answer to cross-question 20, that if any such permission, even as he represents, was given, it was given at the instance of the defendant Newton; and it was equally clear, from his answer to cross-question 29, that it was on the representations contained in his letter of June 9, 1869. Now, a careful examination of that letter utterly fails to show a description of the machine, Exhibit D, and its approach to a part thereof is so dis-

guised as to be scarcely recognizable; and further, it omits utterly to state that the machine he intended to construct would contain the invention of Mr. Lewis, though it is clear from the evidence that he knew of Mr. Lewis' invention in 1868. All the facts bearing on this point show conclusively that this infringement was a plan of his own, entered into with full knowledge of Mr. Lewis' invention, and carried into effect without any possible excuse of ignorance on his part. And it does not appear even that this letter of June 9, 1869, went even so far as to ask permission to build what he there described. He simply stated his purpose to build it, and that was all. He proposed to do it, and that seems to have been enough, and is all we have any proper proof to show. Clearly from the evidence he seems to have managed the whole affair.

And what does he do, now that this suit is commenced? Does he come forward in a manly way and admit what is perfectly apparent, that, if there is any fault in the matter, it is his, as readily as he appears to have been willing to claim whatever credit might have been due to the enterprise; or does he undertake to avoid responsibility, by laying the blame upon somebody else? He does exactly the latter, and now undertakes to lay the whole thing upon the Secretary of War, as we may see from his answer to question 3, page 142, notwithstanding there is nothing whatever to indicate that the Secretary of War had any knowledge of the machine, Exhibit D, or its intended construction, till after it was built and put in operation.

We have seen, from Newton's own testimony, that the permission which he says he received from Gen. Humphreys does not cover the case, as a matter of fact, for it does not cover the invention, or the construction shown in Exhibit D, and Newton's attempt, then, to throw the blame of this infringement upon the Secretary of War is, then, not only a not very praiseworthy attempt to shirk responsibility from himself, but is also useless as a defence. But will it be contended that, because this invention has been used for the benefit of the Government, the defendants are there-

fore not liable for infringement? Might not the defendant Newton, for the purpose of making himself appear to be a very economical agent of the Government, and thus increase his popularity, or for any purpose, no matter what, with the same propriety, go into a stationer's store, and, when the owner's back was turned, carry away his goods and apply them to Government use, and then, when called to account, say that those goods had been used for the Government, and he had derived no profit or advantage from them, and was, therefore, not liable? If our bill was for profits *merely*, it might possibly be worth our while to discuss this point more extensively, but our complaint is drawn under the Act of 1870, and is for damages as well as for profits. Whatever, then, may be the rights and liabilities of the Government in the matter, it is entirely clear that the defendant Newton, in taking this invention, has done that which he had no right to do, and is liable for the wrong he has done.

In conclusion, we may say that perhaps the Court has never, in its whole administration of justice, had occasion to deal with a more unscrupulous or wanton and cruel infringement than this. It was a dark proceeding from the beginning, without one bright spot or redeeming feature to enliven or even relieve its black and gloomy shade; and it was apparently well planned and skilfully executed, to stimulate inventors to action and then rob them of their rights. And first in the catalogue of events comes this appeal to the inventive ingenuity of the country, in Newton's report of 1867, to which we have already referred. Inventors had a right to understand this to be an *honest* appeal, as a matter of business, on business principles, and to expect from that appeal, that if they helped him out of his difficulty, and he used their aid, they were to be paid for the services thus rendered and used. They were not called upon to presume that it meant that they were to be lured into expending their time, abilities and money in the production of the needed invention, and then, deliberately robbed of any invention, they might, by their genius and efforts, produce to accomplish this important and valuable result. But which of these things did it

mean? His announcement to Lewis, at that last interview, of his intention to appropriate any invention he could lay his hands on he might happen to want, as testified by Lewis, page 50 of the complainants' testimony, and not contradicted by Newton, tells the whole story, and gives the key to the whole situation. That shows exactly what this encouragement meant, and shows that this inducement to inventors was hollow and insecure to the last degree. That shows clearly enough that this whole matter was simply a scheme to encourage inventors to action, and then rob them of their inventions. What did Newton care how many a poor inventor spent sleepless nights on his pallet of straw in producing the invention required, whether he spent his first or last dollar in perfecting it, or was even obliged to apply to his neighbor to patent it for him, so long as Lieut. Col. John Newton had simply to take possession of it when it was done, and employ it for his own aggrandizement? An *honest* man would have scorned to thus appropriate another man's property—to thus rob a poor and struggling inventor; but it does not appear that any such scruples troubled the serenity of the defendant Newton, or interfered with his repose. The next step, after stimulating the inventive faculty in the manner already referred to, was to gather the results into his net, and it appears from the testimony of Lewis, supported by that of Cammeyer, and not contradicted by Newton in his own testimony, that several interviews took place between them, in which Lewis described the invention and showed Newton the model and photographs of it. It is true that the witness Meeker testified that he never saw a model or drawings or photographs of that machine at that office; but it is evident that they might have been there nevertheless, and this witness not have seen them, and the question naturally arises, why, if Mr. Lewis' statement was untrue, Newton did not so testify in his own testimony; and if it was true, whether it was honest to attempt to deceive the Court into the belief that they were not there, by this evidence of the witness Meeker, that he did not see them. Having heard all Mr. Lewis had to tell, and having gained a full knowledge of

the invention, the next proceeding was to construct and use it; and observe how cautiously he introduces his invention to the Government. He knew then, as well as he does now, all about Mr. Lewis' invention; all about its still-water dam, made in sliding or telescopic sections; all about its self-anchors; all about its drill frame inside of it, near the rock; all about its combinations with the boats, windlasses, chains, anchors, etc., but does he, in his letter to the Chief of Engineers of June 9, 1869, describe these devices as they are represented in the patent, or as he intended to construct them as shown in Exhibit D? On the contrary, everything is as much disguised as possible. It was not safe to give a full and accurate description, for it might happen that Lewis or Cammeyer had been to the office of the Chief of Engineers with their patent before him; and the recognition of Lewis' invention by the Chief of Engineers might upset all his plans; for, of course no officer, having regard for his own honor, could approve such a scheme of spoliation and wrong as Newton had contrived. His boat was simply described as a scow with a well-hole in the center. His dome in this description of 1869, instead of reaching the top of the water by sliding or telescopic sections, as shown in the patent, and in Exhibit D, is represented as constructed with a fixed funnel at the top, and considerable pains seem to have been taken to show, by water lines marked on the illustration, that it actually did go to the top of the water, and the boat is not represented in this illustration. In the description, every allusion which would be likely to direct the mind to the Lewis invention seems to be carefully avoided, and, looking carefully over the document, we should be compelled to say that it is just such a one as a person knowing of Mr. Lewis' invention, and desiring to keep it in the back ground, would write, provided he were sufficiently skillful in that kind of efforts to do so. But in January 1870, he had got this machine constructed, and having succeeded thus far, less caution was necessary than was required in the first instance. And then comes what we may fairly conclude was a part, and probably a principal part, of his original intention, and he claims the invention himself, and goes on to tell

about having had to turn inventor, etc.; and in the closing portion of his letter speaks in glowing terms of the advantage to Government, with evident intention to gather to himself the whole praise and credit of the invention, and saying that the amount that can be saved by taking advantage of the knowledge gained may be reckoned by millions, while all the while he knew all the principal features of Mr. Lewis' description in 1868, and knew perfectly well that Lewis, and not himself, was the inventor of them. Again, in his letter of September 29, 1871, he speaks of this machine and its capacities for use, and concludes by saying that "it has fully proved its ability to perform good practical work." Up to that time the complainants had taken no steps to enforce their rights, and, in fact, did not know of the infringement, and Newton could well afford to congratulate himself on the success of his scheme, if, indeed, any man can afford to congratulate himself on the success of a dishonorable act. Up to this time there is not a word that the machine was constructed by authority of any other person than himself, or that any other person than himself was entitled either to the praise or the blame of the enterprise; and, in fact, the whole tenor of his reports to the Chief of Engineers, up to that time, is at variance with any such supposition. In every one of these reports he speaks of the enterprise in language which indicates that it was a matter wholly and entirely instituted, directed and controlled by himself; and there is not a word or a line in the whole of them to indicate that the authority of the Chief of Engineers, or the Secretary of War, had been given or even invoked in the matter.

Now, is it possible to conceive that a shrewd and unscrupulous man, seeking to induce inventors to make a specific invention, with the purpose of afterwards robbing them for his own purposes, would have varied this programme in the slightest particular. An honest man, desirous of doing exact justice, would have notified the Government, in the first instance, exactly how the matter stood, and if he had thought the invention one which the Government needed, would have recommended its purchase at a fair price.

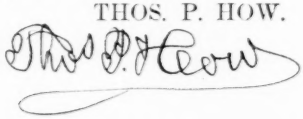
In 1872 this suit was commenced, and then Newton's tactics changed materially, but only in accordance and furtherance of the original scheme which we have suggested as being indicated by the evidence in the case, and are still in complete harmony with it, and only so far modified as the changed circumstances rendered necessary, apparently, to save such scheme from destruction. And he commences his answer with a denial of any knowledge or information sufficient to form a belief as to the existence of the invention, or of any part of it, a denial which is not only contradicted by the very next paragraph of his answer, but is also shown by testimony to be clearly untrue. Next he denies the utility of the invention, and next alleges that he invented a machine, in 1869, which was constructed at the expense of the United States, which we presume he intended the Court should infer is the machine in question, and that neither of the defendants have derived, or expect to derive, any pay or profit from the invention. Finally and lastly, in March, 1873, when all other means of defence seemed to be failing, he adds to his answer the defence that he invented the invention in controversy himself, and described it in a printed publication in 1867—a variation of about two years from the date of the invention alleged by him in his original answer.

We say, then, that all the facts of this case indicate an intention on the part of the defendant Newton to first stimulate mechanical invention for this purpose, and then rob the successful inventor of his right, and that his acts throughout show a deliberate purpose to deprive the complainants of their property in this invention, and that the whole state of the facts, as shown, is consistent with only these conclusions; and we repeat that the Court has probably seldom or never had to deal with a more wanton and unscrupulous or unjust and inexcusable infringement than this. And it matters not what his purpose was in thus infringing the patent, or whether (under the Act of 1870, which gives damages as well as profits for infringing), either of these defendants has ever made, or now expects to make, a single dollar out of the infringement. That he had *some* object in

view is clearly apparent, for no scheme was ever so well planned and skilfully executed without some object; and whether such object was accomplished or not, makes no difference in regard to his liability in this case: he has infringed the patent, which the law says he shall not do; and not only that, but has done so with a full knowledge of the invention and rights of the complainants, and is liable for the damage they have sustained, and is also liable to injunction against further infringement. Nor does it make any difference whom he associated with himself in the infringement, or whose money he used in carrying it out; and if he really deceived the Government by his misrepresentations, and obtained, as he claims (but does not show by any satisfactory proof), leave from the Chief of Engineers to construct a part of the machine shown in Exhibit D, that does not help the case—the proof is that he planned, originated, and carried out the infringement, and but for him there is no reason to suppose it would have been committed. And this deception of the Chief of Engineers, if it produced the effect of obtaining this leave, should, instead of being regarded as a mitigation, be regarded as an aggravation of the case against him; for certainly it cannot be to the credit of any man, either morally or legally, to say that he has misled his Government or any officer thereof into a wrongful act.

Respectfully submitted,

THOS. P. HOW.



In the Supreme Court of the United States.

OCTOBER TERM, 1876.

WM. H. CAMMEYER ET AL.
vs.
JOHN NEWTON ET ALS. } No. 114.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE SOUTHERN DISTRICT OF NEW YORK.

Brief for the Defendants.

In the Supreme Court of the United States.

OCTOBER TERM, 1876.

WM. H. CAMMEYER ET AL.
vs.
JOHN NEWTON ET ALS. } No. 114.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE SOUTHERN DISTRICT OF NEW YORK.

BRIEF FOR THE DEFENDANTS.

This is a bill in equity filed in July, 1872, to obtain an injunction and an account of profits and damages by reason of an alleged use by the defendants of the complainants' "new and useful still-water dam," covered by letters-patent No. 80492, issued July 28, 1864, in the blasting operations upon the reefs at Hell Gate, in New York Harbor.

I.

The machine described in letters-patent No. 80492 is neither new nor useful. It is not a new discovery of these patentees, because the complainant Lewis was not the sole and original inventor of it. He testifies (folio 183) that it was General Newton's report of 1867 to the

War Department that first drew his attention to the subject. A published copy of this report was communicated by the Secretary of War to Congress February 11, 1867, the report bearing date the 21st of the preceding month. In it he suggests means of breaking the current substantially the same in principle as those subsequently adopted by Mr. Lewis. (See the quotation from this report in the opinion of Blatchford, J., annexed to the record Thomas *vs.* Weeks, 2 Paine, 92.)

Lewis was not a practical operator; he was a theorist The necessities of contract-work, actually to be performed, had led Geo. W. Townsend, in 1867, to construct and use, in Boston Harbor, a machine, in its essentials the prototype of that patented by Mr. Lewis. As will be further remarked hereafter, the radical difference between Lewis's model of or plan for a machine and that actually operated by General Newton was that General Newton operated from the rocks themselves, at the bottom of the river or harbor, while Lewis operated from his floats. General Foster's testimony shows that Townsend employed the same combination of boats, anchors, chains, and windlasses as the complainants proposed to use, and for the same purposes. If, informed by actual experiment, he afterward used his machine detached from any connection with his boats, that does not affect nor concern the present suit.

II.

As described, it was not a useful invention. It was not a successful embodiment or development of the principle suggested by General Newton, but failed from lack of appreciation of the difficulties of practical operations. Its defects were such as to prevent that machine

from ever becoming of any utility. It is admitted always to have remained in the realm of theory. It was the work of a theorist. General Newton's was that of a practical operator, whose daily duties and long experience had led him constantly and anxiously to consider the subject; to familiarize himself with the minutest details, and with all the multitudinous changes of the requirements, under the influence of winds, tides, currents, and temperature, and with reference to the end to be accomplished.

Lewis's machine was intended to be operated from a square or rectangular platform, supported at each corner by a boat, which was secured by anchors aft, forward, and amidships. Some of the chains extending from the boats to their anchors were to pass through ring-bolts in the lower section of the machine in order that the anchors might serve to keep that in place as well as the boats. The practical consequence is so obvious as to need only to be suggested. If these chains were slack the winds and tides would cause the boats and platform to be so incessantly changing position as to jam the joints of this telescopic, self-adjusting machine, so that it would cease to adjust itself to the rise and fall of the tide, and thereby deprive it of that feature which was doubtless supposed by its originator to constitute its chief recommendation; and the drill-guides would so fluctuate and bend as to prevent the operation of the drills. If, on the contrary, the chains were kept taut by the *constant, momentary, tireless* vigilance on the part of a workman, so as to keep the machine and drill-tubes always in their proper perpendicular position, then the waves caused by every passing steamboat would cause the whole combination (rigidly bound together) to be

moved from its place. If this were not so we should have a practical solution of the old problem suggested for discussion to country debating societies, as to the effect upon an immovable body of an irresistible force!

III.

There was no infringement.

The difference which most plainly distinguishes the machine actually operated by General Newton from the theoretic one of the complainants is that former was operated from, as well as upon, the reef, while it was proposed to operate the latter from the boats, with which there was maintained, as part of the patented machine, an inseparable attachment. The so-called system of anchors, as applied to the boats, is nothing new or patentable. Vessels frequently are moored in a narrow tide-way with anchors from each bow and each quarter; putting out one more on each side, amidships, cannot be a new invention. As to the self-anchoring adjustments to the lower section of complainants' machine, these were not used by General Newton, and could not be used in any machine actually operated. The legs at the bottom of the caisson used by General Newton were to level it up, and, being once dropped, could not be raised again by any connection with the operations above the surface of the water. Nor did the top of General Newton's machine have any firm connection with the boat from which the workmen operated the drills. In the complainants' machine the self-adjusting anchors, holding the lower section firmly to the rock, and the upper section being securely fastened to the platform extending over the boats, while additional chains ran through the ring-bolts of the tele-

scopic dam to the anchors attached to the boats, the whole concern was so rigidly fastened together that if an unusually high tide, or a tempest, or a collision stretched the attachments to their utmost extent, the machine would infallibly be destroyed or greatly damaged; whereas a high tide, &c., might sweep away the boat used by General Newton and leave his caisson, drill-tubes, &c., intact. Again, the form of the complainants' structure was such as to expose it to the full force of the rapid current, while the dome-shaped caisson of General Newton was kept down not only by its own gravity, but by the angle at which it was struck by the flowing or ebbing tide, or by whatever side-eddies might be created at any time or stage of the water. The differences between these machines are indicated in the testimony of Generals Foster and Tower, and in the opinion of the court below, and are apparent from an inspection of the models of each party.

The complainants rely upon the statements of their expert witness, and at the bottom of page 19 of his brief their counsel ventures upon a comparison of them with those of Generals Foster and Tower, assuming that Mr. Renwick is more reliable because by profession one who gives testimony as an expert! The experience of the members of this court will judge of the soundness of this position. In the celebrated Palmer poisoning case, in England, in 1856, the attorney-general said, (as reported in 1 Law Mag. and Rev., 341:) "I have no language to express my abhorrence for that *traffic testimony* which, for the sustentation of a particular theory, men of science occasionally are led to offer." And, in charging the jury in that case, (same vol., 342,) Lord Campbell remarked: "It is, in my opinion, indispensable to

the administration of justice that a witness should not be turned into an advocate nor an advocate into a witness," saying of one person, to whose testimony he adverted, "certainly he seemed to display an interest not quite becoming a witness in a court of justice." The clear opinion of Judge Blatchford, which is appended to the record, obviates the necessity of greater elaboration in this brief.

We will add, however, that the use of the words "portable and adjustable," in the claim, gives the complainants no right to any patent, nor can they be used as the foundation of any action against other parties who might thereafter invent or use a portable or adjustable dam. These are simply words of description, and are of no more consequence, as against these defendants, than the words "new" or "useful," had they been used in place of the former.

There is no invention or construction resulting from the intellect and power of humanity that is not portable, and no machine has ever been devised which was not susceptible of adjustment. So, as against these defendants, these words can be of no effect; but the plaintiffs, having adopted and used these words, can claim nothing, as against these defendants, but *such qualities* of portability and adjustability as they have shown by description and model that their machine possesses. A glance at the models will satisfy the court how widely these two machines differ in these respects.

The complainants' dam is portable in that it is firmly and rigidly attached to and forms part of the floating structure designed for its support and movement. This floating structure is movable, and intended for transit from place to place; and with it, accompanying every motion, must go the dam.

The dam and float are made and are intended to be one structure or machine. The two form one whole, and either is inseparable from the other. Any disconnection of these would be destructive to the purposes for which the machine is intended, and would terminate its existence as an apparatus such as is set forth in the patent, and its application to the purposes it is intended to effect.

The defendants' machine is, in one sense, portable, as is any structure that may be carried from place to place; but it is not attached to, nor does it form a component part of, any combination of machinery of which the transporting power is an essential and necessary component. It has with it, and it is carried by, a boat upon the water, as would be any machine designed for submarine work, and is provided with appliances by which it can be carried from place to place upon a floating structure; but that done, it has no other connection with or use for such floating structure in fulfilling the objects and purposes for which it was designed. It is one of those tubs that can and does stand upon its own bottom, and is as independent of the float by which it was brought to the position in which it may stand as is any other caisson, coffer-dam, or subaqueous inclosure that stands with its lower part on the bottom of a stream and its upper end reaching to, or nearly to, the surface of the water.

IV.

The only use made of the machine operated upon the reefs in New York Harbor was by the United States. Conceding that the Government would be liable to make compensation to the complainants, if it was their machine

that was used, (United States *vs.* Burns, 12 Wall., 252)—though such is not the English doctrine, (Feather *vs.* Queen, 6 Best & Smith, 283)—nor did that issue distinctly arise in the Burns suit, since that was based upon contract; yet the *mere* agent of the United States ought not to be held responsible. It was the action of the Government, through the War Department, whose orders General Newton was bound to obey. It was not the case of a person contracting to do work, or erect a structure, in the completion of which he uses a patented device or implement.

General Newton neither did nor could receive any profits from the use of whatever machine he employed in his work for the United States; therefore is liable for none. Rubber Co. *v.* Goodyear, 9 Wall., 804; People *v.* Supervisors, 4 Hill, 23.

Of the other defendants, Isett never had aught to do with the machine, or its operation; and Quinn and Eccleston were simply employés, hired by General Newton; so that their action was either his or that of the Government which he represented.

EDWIN B. SMITH,
Assistant Attorney-General.